Volume 94 Number 9

STEEL

Production · Processing · Distribution · Use

The Week in Perspective

MODERNIZATION, rehabilitation and expansion of steel finishing capacity, given another filip by Ford's plan to install blooming, sheet and strip mills at Detroit, are proceeding at a rapid rate, with many projects still in the contemplative stage. This is in sharp contrast to code-bound steelmaking capacity, which cannot be enlarged. pp. 10, 15

CHARLES M. SCHWAB, turning 72, renounces the bridge table and other social life, but forswears any intention of abandoning interest in his "monument"—Bethlehem Steel. p. 10

ALLOY STEELS have helped the navy department to lead the way in reducing ship tonnages by adopting lighter materials without sacrificing strength. p. 14

MASS PRODUCTION of houses for 200,000 families now with inadequate homes is an idea being pushed ahead actively by government agencies. Need for heavy steel tonnage is indicated. p. 13

HEAT IS ON in more open hearths as the steel production rate makes a new altitude record for the year—47 per cent. A rising rate is seen into April. p. 12

BLAST FURNACE SLAG is being dry-granulated successfully by a machine developed in England recently. p. 34

FORGING FURNACE of the slot type employs water-cooled cast iron blocks in slot to keep one end of stock cool for header grippers. p. 22

AMERICAN INDUSTRY in the broad sense finds itself in disfavor at Washington because of the sins of a few of its components. Official minds need a clearer picture of functioning of the average industry. p. 18

LARGE IRON CASTINGS, in the form of statues, were made by the Chinese as early as 1000 and 1200 A.D. p. 37

GAS ANALYSIS equipment, installed on industrial furnaces, has proved worthwhile protection against excessive fuel consumption. p. 25

LIBERALIZATION of employe representation has been effected in plants of large producers in the Pittsburgh district, at the same time an agreement being reached between employes and employers in "captive" mines of western Pennsylvania. p. 11

COLUMBIUM, comparatively rare metallic element, has been shown to inhibit intergranular corrosion in austenitic chrome-nickel steels. p. 26

NET LOSSES of about 60 millions were sustained in 1933 by 11 leading ingot producers, indicating an average loss of approximately $3.25 per ton, contrasted with per ton deficit of $12.64 in 1932. p. 12

FROG AND SWITCH BOLTS are given separate heat treatment after being forged, in the plant of a Pittsburgh boltmaker, to assure high physical characteristics. p. 21

ECONOMIC SECURITY—its restoration and maintenance are the chief concern of the nation today. Engineers are capable of contributing to this end, says a prominent executive. p. 37

HARDENING SURFACES of malleable or gray iron castings is accomplished by a new process known as electriding. p. 23

INTERNAL GRINDING of small parts is performed in a new machine embodying the centerless holding principle, three rolls—regulating, pressure and supporting—guiding the work. p. 24

Report New Finishing Mills For Ford; Much Expansion

HENRY FORD was expected late last week to complicate the automotive steel situation still further by announcing that he had awarded contracts for additional semifinished and finished steelmaking capacity at his steelworks in Fordson, a suburb of Detroit.

It is definitely known that negotiations have been under way for several weeks for a 44-inch blooming mill and finishing equipment ranging from a mill for rolling strip for frame stock to a continuous sheet-strip mill. (See p.15).

Evidencing the astonishing recovery of the automotive industry, only a year ago, there is good reason to believe, the Ford steelworks including its two blast furnaces and 10 open-hearth steel furnaces, having an annual capacity of 375,000 tons of pig iron and 600,000 tons of steel, was on the market.

Recent reports of an expansion in the Ford line of automobiles now acquire some authority. It is no secret that a V-8 engine has been developed for a slightly smaller car than now offered, while body builders are figuring on radical streamline design.

Turn Screws on Steel Prices

This step of Ford to make itself more self-contained—it now produces all its pig iron and much of its bars, spring stock and wire—climaxes a period during which the automotive industry has brought great pressure upon steel prices, aimed at higher bases and firmer extras filed under the NRA steel code.

Only last week Ford obtained a victory when the price of sheets known in the trade as Ford specials was reduced $2 a ton to 2.65c, Pittsburgh, for No. 24 gage, and to 2.75c, Gary, Ind.

A month ago General Motors expressed its displeasure at steel prices by distributing considerable business among small producers at the expense of large ones, and made an offer for control of the Corrigan, McKinney Steel Co., Cleveland, and its subsidiary, the Newton Steel Co., of Monroe, Mich., and Newton Falls, O.

In contrast to the reduction on Ford sheets, it is understood that makers of hot-rolled strip are cancelling the recent reduction of $1 per ton at Chicago and subsequently at Pittsburgh, returning this product to 1.75c, Pittsburgh, and 1.85c, Chicago.

¶The Ford program directs attention to recent expansion in finishing capacity, which is permitted under the steel code in contrast to the inhibition on installing raw steel capacity:

Mills in southern Ohio and in the Baltimore district are contemplating adding facilities for rolling sheets over 70 inches wide.

New hot strip mills are projected in New York state and in Detroit.

A Mahoning valley maker of bars is preparing to install a mill for making precision round hot-rolled bars.

Expand Welded Pipe Mills

A steelmaker in the Weirton, W. Va., district has confirmed reports that it contemplates erecting a fabricating plant.

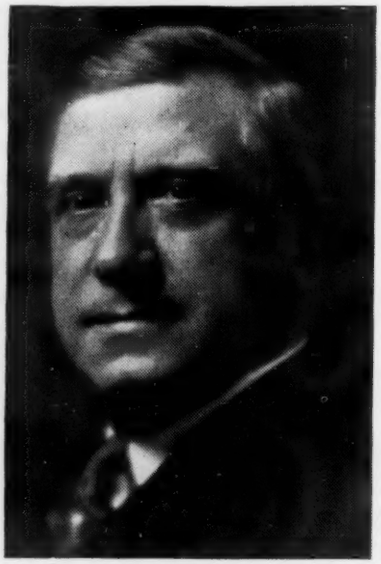
Youngstown Sheet & Tube Co. is expanding its electric weld mill at Brier Hill, will make railroad spikes at its Struthers plant, is rearranging its universal plate mill at Indiana Harbor, and has authorized construction of a 42-inch Steckel hot-strip mill at Indiana Harbor.

If Republic brings the Gulf States Steel Co., Birmingham, Ala., into its fold, it is likely to install equipment for making electric welded pipe.

American Rolling Mill Co. contemplates a $100,000 improvement program at the Belfont Steel & Wire Co., Ironton, O., which it recently purchased at receivers sale.

Wheeling Steel Corp. last month awarded a contract for a continuous strip mill at its Yorkville, O., plant.

Steel & Tubes Inc., a subsidiary of Republic, is enlarging its facilities for the manufacture of boiler tubing.



BETHLEHEM HIS MONUMENT: Celebrating his 72nd birthday Feb. 18, Charles M. Schwab, nestor of American steel men, confirmed that he was retiring from active participation in social and business affairs, lightening his load even to the extent of withdrawing as president of the Whist club, but retaining his interest in the Bethlehem Steel Corp. Said he: "As for retiring from Bethlehem, that I will never do. It is the one thing I have that holds the greatest interest in life for me. It is my monument and I am proud of it." Philosophical books, historical novels and autobiographies rather than sales reports hold his interest nowadays, Mr. Schwab concedes

Institute

GENERAL reaffirmation of prices for second quarter on plates, shapes, bars, wire, pipe, pig iron and semifinished appears assured, as no changes were filed with the American Iron and Steel institute in the past week and the date, March 1, for which producers are permitted to open their books for that position is only three days off.

Price on standard rails of $36.-37 1/2, mill, expiring March 1, is likely to be extended. Only a portion of the 845,000 tons of rails under negotiation at the time rail producers' acceded to the wishes of President Roosevelt last fall in the matter of the present price has been placed to date. With assurances from Washington that the remainder—approximately 500,000—will be placed over the next several weeks, producers' continued adherence to the present level is probable This price, it may be recalled, was a compromise with Railroad Co-ordinator Eastman, who held out for $35 or less.

In sheets and strip, the future course of the market does not appear so well defined. Despite heavy demand for automobile sheets, with some mills even two weeks or more ago sold up for the remainder of this quarter, prices have been filed, effective this week, on new classification of sheets for the automotive trade, which in effect, are down $2 a ton.

The new description is "hot rolled pickled in the breakdown annealed deoxidized sheets, No. 24 gage," and is priced at 2.75c, Gary, Ind., and 2.65c, Pittsburgh, effective March 1 and March 2, respectively. This is $2 at both points less than No. 20 cold rolled, which grade, it is said, will be competitive and $2 under the price of No. 24 hot rolled annealed, plus the necessary extras. It is understood that this new classification was established primarily to meet the demand of one large Detroit automobile builder.

¶Recent reductions of $1 per ton in hot-rolled strip at Chicago and Pittsburgh are being withdrawn. Some Chicago mills are understood already

to have refiled the former price of 1.85c, Chicago. Apparently the Pittsburgh market will rebound from 1.70c to 1.75c.

¶In pig iron no changes have been filed since the 50-cent reduction in basic at Neville Island, Pa., to $17, earlier in the month. In fact, at Everett, Mass., formal reaffirmation has been made on all grades for the second quarter. Other furnaces are expected to file shortly.

¶Commercial resolution No. 48, adopted Feb. 2 but only now announced, sets up regulations governing agreements between members of the steel code and other parties for the conversion of materials into products by members of the code for such other parties.

PWA

ALLOTMENTS by PWA Administrator Ickes totaling $2,898,165 include waterworks construction for Sevierville, Tenn.; Oak Hill, O.; Missouri Valley, Iowa; Sedan and Copeland, Kans.; Cotton Plant and Calico Rock, Ark.; Rocky Mount, N. C.; Sycamore, Ill.; New York Mills, Sherburne county, Wheaton Wheaton and Litchfield, Minn.; and Silverton, Colo.

¶PWA allotments of $156,400,000 will provide sewers and sewage, garbage and refuse disposal plants in 345 cities and towns.

NRA

APPEARING before the house labor committee Wednesday, Gen. Hugh S. Johnson, NRA Administrator, opposed the Connery 30-hour bill.

He favored a further curtailment in hours but did not believe a flat rule could be applied. If employers engaged in cut-throat competition on prices they would soon come to the point where they would try to reduce wages, initiating another downward spiral in wages and employment, he warned the house committee.

Opposing the proposal for equal representation of labor on code authorities, General Johnson observed "labor has a view of everything that is being done." He estimated 3,000,000 men have gone back to work as a result of codes, and 8,000,000 still are idle, the latter figure not covering 4,000,000 employed on civil works.

¶ Codes approved: Chilled car wheel, effective Feb. 26; knitting, braiding and wire covering machine industry; railway car building, to be effective Feb. 21.

¶ Hearings scheduled: Costing system and production cost schedule of malleable iron code authority, March 3; advertising metal sign and display manufacturing industry, March 1.

¶A model state recovery law to supplement and strengthen application of NRA has been submitted to governors by NRA Administrator Johnson.

Uses of Steel

AMERICAN MANAGEMENT ASSOCIATION, New York, announces a competition for the third Irwin D. Wolf award for the most effective package developed and placed on the market between Jan. 1, 1933, and Feb. 15, 1934. Separate groups include tin containers, tubes, canisters and shipping containers. Entries will be received from Feb. 26 to March 8.

Meetings

AN INDUSTRIAL products exhibit sponsored by the Milwaukee Association of Purchasing Agents will be held at the Hotel Schroeder, Milwaukee, April 3 and 4. Wisconsin products will be featured but the exhibit will also include goods manufactured in other states and handled through local jobbers.

There will be approximately 100 booths, exhibits for which will be arranged for by Ole A. Olsen, of the A. R. Timberman Corp., and Walter Wenzel, of the Vilter Mfg. Co., co-chairmen of the arrangments and exhibits committees. Albert Korsan, purchasing agent, Globe Steel Tubes Co., is general chairman.

¶British Institute of Metals will hold its twenty-sixth annual general meeting in London, March 7 and 8.

Labor

EMPLOYES of the Carnegie Steel Co., Jones & Laughlin Steel Corp., and other large producers in the Pittsburgh district voted favorably Feb. 22 and 23 on proposed changes liberalizing their employe representation plan adopted in June.

Typical of the revision is that effected by Carnegie employes, whose plan was printed in STEEL for June 19, 1933. Principal changes follow:

A representative may be elected by a two-thirds majority vote by secret ballot of the voters in his department or unit, 15 to 30 days following approval of a petition signed by two-thirds of the voters.

The 60-day initial period before employes can vote is eliminated.

Voters may place in nomination not more than the number of representatives to which their department or units are entitled. Two persons shall be nominated for every person to be elected. Those who have received the largest number of votes up to twice the number of representatives to be elected shall be declared nominated.

A conference of employe representatives of a plant or a conference of such representatives and representatives of the management may be held as determined by the committee on rules or the joint committee on rules.

Procedure for adjustment is improved, and a clause has been added to the effect "it is understood and agreed that no employe will in any way be discriminated against for exercising any of his rights under this plan."

¶Last week an agreement to settle

BEHIND THE SCENES AT ARMCO: Members of the American Ceramic society, which met recently in Cincinnati, are shown on the steps of the general office building of the American Rolling Mill Co., in Middletown, O., as they were inspecting the plants of that company and also the Frigidaire Corp. at Dayton, O. At Middletown, the guests, most of them members of the enamel division, were greeted by Charles R. Hook, president; W. W. Sebald, Bennett Chapple, and Anson Hayes. F. A. Tobitt, manager of Rolling Mill company's enameling sales department, was chairman of the arrangements committee, assisted by Hugh Wright, of that company, and W. H. Pfeifer and Glen Hutt, of Frigidaire Corp.

the "captive" coal mine situation in western Pennsylvania was reached between officials of the United Mine Workers and executives of the H. C. Frick Coke Co.

These parties concurred on the wording of a contract on Feb. 19 which in effect states that duly-elected representatives of workmen must be dealt with in matters of collective bargaining.

Contracts accept the checkoff agreement for collection of union dues, though the contracts are not outright recognition of the United Mine Workers. Contracts continue until March 31. An open-shop clause is retained.

Both factions hailed the agreement victoriously. Thomas Moses, president of Frick company, said: "We have reached an agreement in the captive tonnage situation." Philip Murray, official of the United Mine Workers at Pittsburgh, was more vociferous in saying that the agreement was a "signal victory."

However, the contracts affected only four Frick company mines, excluding nine Frick mines where the union was defeated at elections a few months ago. The agreements also exclude approximately 16 captive mines owned by independent steel producers where there still are some disagreements.

¶International Harvester Co., Chicago, has advanced wages in all American plants 6½ per cent, bringing wage levels up to 97 per cent of 1929.

¶A ruling by Judge Walter McMahon, of the Cuyahoga county (Cleveland) common pleas court, in the Drake Bakeries case is generally regarded as an important interpretation of section 7*a* of the recovery act. The McMahon decision is that minority employes cannot be coerced into joining a union, nor in permitting a union organized by a majority of employes to represent it in collective bargaining. "There is no mention of a majority of employes controlling the minority in any part of the act," said the judge.

¶ Weirton Steel Co., Weirton, W. Va., last week announced plans for an $85,000 stadium and two $35,000 swimming pools for employes. Weirton employes already enjoy a nine-hole golf course, with club house and other facilities.

Financial

ELEVEN important producers of steel ingots, representing 54,037,000 tons of capacity or 80.3 per cent of the country's capacity, sustained a total net loss of $59,605,866 in 1933. The same producers in 1932 piled up a deficit of $126,709,485.

Assuming these losses to be typical, the indicated deficit for the entire steel industry in 1933 was $74,200,000 compared with $157,800,000 in 1932.

On the basis of a production of 22,800,000 tons of ingots in 1933, and 13,300,000 tons in 1932, the average loss per ton of ingots produced is approximately $3.24 for 1933, and $12.64 for 1932. (See table below)

¶Youngstown Sheet & Tube Co., Youngstown, O., radically reduced its losses in 1933, the deficit for that year, after all charges but before the difference between the cost and face value of bonds purchased for retirement, being $8,342,901, compared with a loss of $13,272,783 in 1932.

Like most other producers, its loss of $1,484,363 in the fourth quarter was an increase over the deficit of $1,177,576 for the third quarter, but considerably below the deficits in the first two quarters of the year.

Youngstown sales in 1933 totaled $49,436,509, compared with $31,798,672 in 1932. Net profit from operations rose from $649,439 in 1932 to $4,634,685 in 1933.

¶Colorado Fuel & Iron Co., Denver, reports net loss of $2,389,063 in 1933, after interest, depreciation, taxes, etc., compared with net loss of $4,253,261 in 1932.

Production

STEEL producers recouped all of their losses in production since the last week of August when their rate jumped 4 points last week to 47 per cent. Indications point to further improvement this week.

Supporting this increase, Youngstown mills advanced 9 points last week, Chicago 6, Buffalo 4½, and Pittsburgh and eastern Pennsylvania each 2. Detroit, Birmingham and Wheeling were unchanged. New England eased off 3 points, and Cleveland 2, the latter due to a furnace going down temporarily for repairs.

Pittsburgh: Up 2 points more last week to 28 per cent for the district, this increase being supported largely by improvement in the rate by a leading independent. Further expansion in this rate is looked for shortly, possibly this week when railroad releases are expected. There continue to be 17 out of 60 steelworks blast furnaces operating here.

Chicago: A gain of 6 points to 44 per cent brought operations to the highest rate since mid-October. While a portion of current output is for stock, heavier finishing mill schedules dictated the addition of steelmaking capacity, with further gains seen for coming weeks. Blast furnace operations are unchanged.

Inland Steel Co. last week lighted six more open hearths, making 17 out of 27 on.

Youngstown—Gained 9 points to 54 per cent last week, and is expected to start this week at 52-54 per cent. A bessemer was scheduled to go down, but 50 out of 83 open hearths continue active. Sheet and plate production has gone up sharply to near capacity. The Newton Falls plant of the Newton Steel Co. has started ten of its twenty sheet mills.

Central Eastern Seaboard—Up 2 points last week to 29-30 per cent, with increasing volume in railroad releases pointing to a further gain this week.

Detroit—Unchanged at 79 per cent, with 12 out of 18 open hearths in the district on.

New England—Off 3 points to 79 per cent, and probably unchanged this week.

Cleveland-Lorain: Down 2 points to 77 per cent as Otis Steel Co. drops

(*Please turn to Page* 16)

Steelmakers' 1933 Deficits Lower Despite Poorer Showing in Fourth Quarter

All Financial Statistics Are Deficits, Except Where Asterisk Denotes Profit

	First Quarter 1933	Second Quarter 1933	Third Quarter 1933	Fourth Quarter 1933	Total 1933	Total 1932	Annual Ingot Capacity Gross tons
United States Steel Corp.	$16,730,271	$8,627,367	$2,717,014	$7,945,455	36,020,097	$71,175,704	27,630,000
Bethlehem Steel Corp.	5,769,451	3,312,846	283,097	629,671*	8,735,723	19,404,431	9,457,000
Republic Steel Corp.	2,453,435	407,451	148,239*	1,268,472	4,049,253	11,261,194	4,848,000
Jones & Laughlin Steel Corp.	2,060,645	1,682,801	1,143,917	626,418	5,366,997	7,910,149	3,420,000
Youngstown Sheet & Tube Co.	3,473,370	2,207,592	1,177,576	1,484,363	8,342,901	13,272,783	3,240,000
National Steel Corp.	280,844*	1,532,466*	756,565*	242,530*	2,812,406*	1,662,919*	2,232,000
Inland Steel Co.	1,012,053	25,760*	623,612*	529,373*	166,693*	3,045,628	2,000,000
Gulf States Steel Co.	93,481	18,646	166,670*	138,498*	193,041*	518,315	480,000
Allegheny Steel Co.	131,937	282,918*	152,293*	11,257	292,017*	1,052,080	450,000
Atlantic Steel Co.	.....	.....	.....	.....	609,325	575,933	180,000
Scullin Steel Co.	.....	.....	.....	.....	54,273*	156,187	100,000

WINDOWS OF WASHINGTON

Washington Calm—but Wait

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Houses an Outlet for Steel

• • •

Navy Modernizes Practice

WASHINGTON

ANY code authorities who come to Washington next week for the NRA town meeting under the impression they are going to participate in a triumphal march and receive an accolade are likely to be badly mistaken.

Of course, they will be welcomed and flattered by the President when he formally opens the meeting, and General Johnson may polish up his vocabulary and be at some pains to smooth down any fur he has ruffled during the code-drafting process, but—

The primary objective of the administration still is to foster recovery, to accelerate re-employment, to shorten hours of labor and increase wages, to placate labor and aid the "little fellow," and when the meeting is over and the code authorities have returned home they may find they have been on the giving ratner than the receiving end.

There is sincerity in the purpose of General Johnson to educate code authorities in ways of administration and to co-ordinate codes so far as possible Nevertheless, it cannot be forgotten that NRA was set up to increase employment and expand purchasing power. The President has frankly stated he expects industry to absorb labor which CWA has tided over.

The odds in Washington are that NRA is working toward a 36-hour week and a 10 per cent increase in basic wage rates, and the ground work will be laid at next week's sessions. However, it needs to be recognized that even NRA concedes that a fiat on hours of work is impossible.

Altogether, some 7000 delegates are expected here next week, the largest collection of industrial executives ever assembled under one roof. The delegates will do more listening than talking, and the consumer board and other like agencies will probe deeply into their favorite subjects of open prices, basing points, whether prices have advanced too rapidly, etc.

This week's preliminary bout, opening Tuesday, will probably let off considerable steam, especially on the part of those opposed to some NRA practices, which might have obscured next week's meeting. Radicals having fired their ammunition this week, General Johnson can calmly take over the battle field and in his own fashion lead the army of code authorities he has set up.

IT MAY not have been apparent to steel, disturbed by the basing point investigation and the oblique attack upon open prices, but a comparative calm has descended upon Washington the past two weeks. The "brain trust" is a phrase rarely heard, the "professors" have returned home, the 59-cent dollar is apparently disturbing no one, and even personal publicity centering on the President and his family has eased up.

The only jarring note has been the reaction to cancellation of air mail contracts, which has been more adverse to the administration than on any previous issue and has done the most damage because it has created the impression that the administration was unfair. But this calm will be dissipated next week when General Johnson marshals his army.

For steel there was a slight disturbing eruption last week when Representative Connery, of Massachusetts, the congressman who has a complex on a 30-hour work-week, introduced a bill authorizing Secretary of Labor Perkins to set up a bureau to investigate "the mechanization of industry and resultant diminution of employment of industrial workers, and shall investigate and devise methods of preventing the harmful social and economic consequences of such unemployment, and particularly methods of furnishing gainful employment to workers unemployed by reason of such mechanization."

STIMULATION of interest in government housing projects is a leading development at the national capitol this week. Apparently there is no reason why steel fabricators, if they act promptly, should fail to participate extensively in this program.

Four cabinet officers are understood to have discussed the whole proposition during the past week and to have reached certain conclusions.

One is that fully 200,000 family units at present have inadequate homes. Another is that comfortable, desirable dwellings ought to be made available at a cost no higher than $2500 to $3000—this range applying, say, to a 2 or 3-room house with kitchen and bathroom. This cost, it is hoped, can be brought about by applying the idea of mass production to the construction of houses, as well as apartments.

The government has no thought of supplying the $500,000,000 which would be required in eventually carrying out this program. The intention is to organize a survey and encourage the expenditure of private funds for such homes, and assist financially to the extent needed. The preliminary thought is that the building program will include modernization, new private dwellings and apartments and slum clearance and rehabilitation.

That the way to the introduction of steel or part-steel dwellings will be smoothed, appears to be indicated by the appointment of Col. Horatio B. Hackett as general manager of the Public Works Emergency Housing Corp., embracing all housing construction under PWA. Colonel Hackett has been prominently identified with recent activities in designing and constructing steel houses. He

recently was with Holabird & Root, Chicago, and was a member of the board of local improvement of Chicago.

Secretary of Labor Perkins is reported enthusiastic over one housing project which now is under way. This is a group of 3-story, semi-fireproof buildings, containing 292 apartments, totaling 1074 rooms, being erected at Philadelphia on a loan of $1,045,000 from PWA. The development is being erected by the Juniata Park Housing Corp., a limited dividend corporation organized for this purpose by the American Federation of Full-Fashioned Hosiery workers.

Capitalization of the Juniata Park Housing Corp., for dividend purposes, is fixed at a low figure which, PWA officials estimate, will make possible monthly rentals of about $9.50 per room, including heat, light, and fuel for cooking and refrigeration. This whole deal was arranged by the labor union with PWA Administrator Ickes and Robert D. Kohn, his director of housing.

That possibilities for increased circulation of money because of the housebuilding program are practically unlimited is indicated by the interest of labor representatives in this subject. Numerous additional projects of this character are taking form as a result of labor demands, it is said. And it is expected the administration will give ample encouragement and support to the enterprise.

ANOTHER government housing enterprise which is attracting much interest is the first unit of 250 houses now under construction at Norris, Tenn., by the Tennessee Valley Authority.

These buildings will have steel casement windows. They will be heated as well as illuminated by cheap government electricity. Heating units are to include electric ranges and hot water heaters—the latter being built of corrosion resistant material to guard against the unusual corrosive power of the water in that district. Electric refrigerators will be provided.

In planning the TVA housing project, local preference was studied and plans developed accordingly. One of the few innovations was the installation of built-in laundry tubs, unusual in that country.

Steel fabricators who seek to interest federal authorities in all or part-steel dwellings cannot, of course, be expected to have everything their own way, but an advantage in their favor is that the newly-appointed general manager, Colonel Hackett, is thoroughly acquainted with the possibilities of preformed steel members for use in house construction.

Steel houses already are being actively pushed here. In one office in Washington is a suit-case containing a complete steel house in miniature. It is comprised of two sections, each of which can be easily loaded on a motor truck for delivery to the building site, with a certain amount of labor required to complete the job on the site.

In connection with TVA, it is of interest to note that bids are being asked on considerable equipment for the proposed Joe Wheeler dam. Among the interesting units are six large silos, to be built of steel plates and shapes, for the storage of cement to be used in construction. Other equipment includes concrete mixers, revolving cranes, concrete buckets and cement pumps. Purchases will be made at the TVA headquarters at Nashville, Tenn.

WITH four coast guard cutters under construction, three at Charleston, S. C., and one at Portsmouth, Va., interest is focused on nine additional vessels of this type which are being redesigned at the Philadelphia navy yard for propulsion by steam instead of diesel.

Present developments in naval design are of great significance as pointing the way to the future. To a very considerable extent these are actuated because of the importance, under present naval treaties, of saving weight in ship construction. It is the opinion here that the United States navy leads the navies of the world in finding ways of cutting down on the weight of materials.

Saving of weight is effected largely by the use of alloy steels and nonferrous metals. The old heavy tiling in galley and bathroom decks is entirely obsolete, and corrosion-resistant, chrome-nickel steel is used for this purpose. The same metal is used for sheathing around refrigerators, in table tops, dresser tops, etc.

An interesting development is the use of aluminum foil for insulating refrigerating and heated spaces. Weight also is saved by the use of aluminum furniture.

Welding continues to gain ground rapidly in naval construction, oxyacetylene welding to a considerable extent, but arc and shot-welding particularly. The navy department now is revising its specifications for steel forgings and steel castings with improved welding qualities in mind.

Under the code, the navy department encountered some difficulty in establishing a basis for awarding electrode contracts. This was because all makers quoted one price, and the navy department felt that the price quoted, therefore, had no relation to quality.

The navy now is buying electrodes strictly under a new performance value factor developed by its metallurgical department. Samples have to be submitted and the navy tests them and rates them under its new formula, and the supplier thereafter is under the necessity of furnishing electrodes which will live up to the sample.

Army quartermaster corps is an important customer at present, its purchasing program involving between $60,000,000 and $70,000,000 worth of hangars, magazines, houses, barracks, signal corps towers, etc. The army now is specifying largely copper and brass piping for water lines.

Steel beams are to be used in quite a few small structures in which wooden beams formerly were employed. Stainless steel and monel metal are being used to an increasing extent in the kitchens of army establishments.

NOW that President Roosevelt has approved the code of fair competition for the trucking industry, it is the intention of the American Trucking Associations Inc. to revive its complaint of last September alleging that the delivered price provisions of the steel code are discriminatory and unfair and penalize the trucking industry.

Under the steel code, consignees using their own trucks for the haulage of steel to their plants, or designating the trucks to be used, are allowed 65 per cent of the carload freight rates on such steel. If the mill selects the trucker, the railroad delivered price is charged. The trucking industry claims this treatment is unfair.

The trucking code, incidentally, contains an open-price provision by which rates above cost of the service are filed by the individual trucker. As a result, it is expected trucking rates will show considerably less variation in the future.

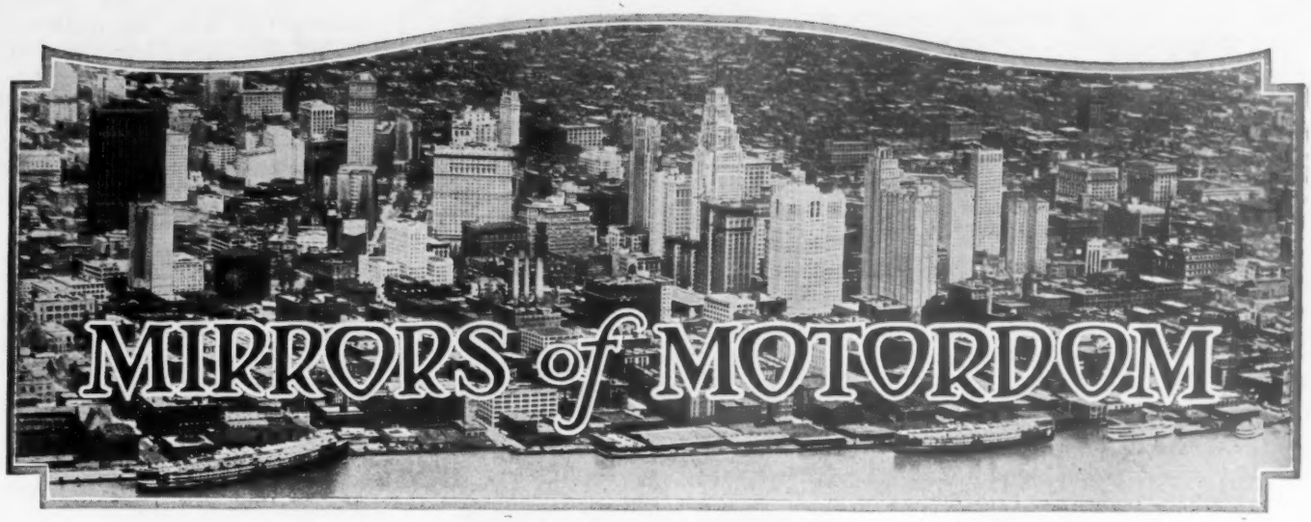
IT IS expected that the so-called MAPI basic code will be signed by the President within the next few days, bringing to a successful conclusion a mammoth job conducted jointly by the Machinery and Allied Products Institute and H. O. King, deputy administrator, and L. J. Martin, deputy administrator, NRA.

MAPI was organized July 20, 1933, for the purpose of co-operating under NRA, with eight associations in its initial membership. Additional trade associations were taken in, and some of them merged, and the membership now comprises 57 associations representing over 900 companies.

Four of the MAPI members already have their own approved codes, individually administered. These are the Heat Exchange, Compressed Air, Pump Manufacturing and Machine Tool and Forging industries. These members, if they desire, may come in as subdivisions.

Of the other members, 39 have applied to become subdivisions of the basic code and 14 are working on codes and are expected to come in as subdivisions of the basic code.

In all cases the members will have their own separate code authorities, but where the code is made subdivisional under the MAPI basic code, each code authority will report direct to NRA, and also to MAPI.



Ford To Roll Sheets, Strip

• • •

Chrysler Output Spurting

• • •

Chevrolet Labor a Record

DETROIT

WHILE the Corrigan, McKinney Steel Co. was standing on the balcony a few weeks ago and General Motors Corp. in the role of Romeo was making overtures to it, Ford was quietly preparing plans for a new rolling mill at Fordson.

Last week several equipment builders and rolling mill authorities were summoned post haste to Detroit by Ford. Though several types of mills for producing flat rolled steel are under consideration, discussion and plans are being focused on a sheet-strip mill capable of producing up to 48 inches wide.

For Ford to be planning a sheet mill is not news. In fact, the report is exactly 19 years old, for in 1915 sheet mill experts were called in to advise on the construction of 24 hand mills. But at no time has Ford come so close to putting a final yes on plans.

Ford's original intention of rolling his own sheets was ascribed to his fear that automobile sheet consumption would outrun the company's sheet producing capacity. However, as sheet capacity increased the idea was discarded in favor of a program of starting from the ground up and not with so finished a product as sheets.

Therefore, two years later—in 1917—construction of the two Ford blast furnaces at Fordson was started. Not long afterward, ground for the open-hearth plant was broken, and in 1925 the rolling mill was built.

Today Ford's capacity includes two blast furnaces rated at 375,000 tons a year; 10 basic open hearths, including the new large 400-ton unit with especially wide doors to receive junked automobiles, ingot capacity being 600,000 tons; two 600-ton mixers; two bar mills; a small spring mill; four wire drawing blocks; and a forge shop with 57 hammers and six forging presses.

Present annual bar capacity is 480,000 tons. This spread between 480,000 tons of bars and 600,000 tons of ingots indicates how the 48-inch mill would dovetail into the Ford program.

There are some who are a little skeptical, recognizing what the effect of the negotiations might have upon the steel markets, on which automotive consumers have been bearing down, but Fordson last week was promising early action—possibly this week—and was asking a quick delivery date. A 44-inch blooming mill is rumored a possibility.

There are some in Detroit who attach great significance to the revival of expansion of the Ford steelworks. Paramount perhaps is the deduction that Ford sees the automobile industry on the eve of a big swing upward, and he may be preparing to broaden his line. It will be recalled that rumors have long been current of a still smaller Ford, for which the engine has been fully developed, while only last week STEEL was first to hint that a radically streamlined body is being designed for Ford.

Coincidentally, the potential strip mill referred to (STEEL, Feb. 12, p. 15) for another Detroit buyer is still being kept alive. Possibilities are that a mill to make narrower sizes than first reported will be decided on, odds favoring now a hot-rolled strip mill to produce up to 12, not 14, inches in width although some believe that a Steckel-type strip mill may be considered. For the time being the buyer of this mill prefers to remain undisclosed.

The trend toward wider sheets, necessitated by streamline body designs, is responsible for reliable reports that a steel producer in southern Ohio is planning to install a unit to roll sheets up to 78 inches, while a Baltimore district mill is contemplating a 72-inch mill.

ABOUT to enter March, the automobile industry still is in the position where its only limitation is its ability to produce. But in March there will be some readjustment in leadership.

Chrysler, unusually handicapped in attaining volume by reason of making more radical changes than other leaders this year, will benefit from real production for the first time on the new Desoto and Chrysler as well as further expansion at the Plymouth and Dodge units. Chrysler is now planning 92,000 jobs for March, probably a monthly record.

Incidentally, Willys-Overland at Toledo is supplying connecting rods to Chrysler, supplementing production in Chrysler's own plants in Detroit. Walter Chrysler, at one time with Willys, several months ago was reported a possible purchaser of the company.

Ford assemblies, practically unchanged at close to 4000 units daily, of which 2500 are being assembled at Fordson, indicate an 85,000-unit month. Ford branch plants appear to be better stocked with parts than those of other makers.

The Ford assembly plant at Winnipeg, Man., idle since last Aug. 1, has been reopened. Ford Motor Co. of Canada, employing over 4000 persons, or the highest since last summer, is operating 8 3/4 hours daily, five days a week; its February schedule was 4365 cars and trucks, and the March schedule is even greater.

Chevrolet early last week set a new all-time high in employment when over 56,000 men were listed on its payrolls, exceeding by 1000 the peak of 1929. Last week Chevrolet assemblies touched 3770 in one day.

The February Chevrolet total probably is slightly more than 70,000 models, and March will be even a better month. Balanced deliveries still are difficult for Chevrolet, deal-

ers having difficulty obtaining specified colors in specified models.

Plymouth assemblies are better than 1000 daily. Over the past ten days advances in production place Buick, Pontiac, Dodge and Hudson rates all on higher levels.

Buick, working multiple shifts, is exceeding 500 assemblies daily. Pontiac has increased its order backlog by 5000 cars in two weeks. Hudson, at 400 jobs daily, last week prepared to close on contracts for additional models to its present line but probably not to be introduced much before May.

Hudson-Terraplane shipments in the week ended Feb. 17 totaled 2412, highest for any week since July, 1932. March assemblies are expected to be a minimum of 18,000.

Even the high-priced cars are being bitten by the bug of assembly increases for March. Cadillac will begin to produce 1934 LaSalles next month and has scheduled 100 LaSalles and 75 Cadillacs daily. At 175 models per day, this will be an all-time peak for Cadillac, the previous assembly high having been around 125 jobs.

Lincoln is rapidly working off 1500 models that on Jan. 1 were planned for the first quarter. The last release by Lincoln was on 1000 of this 1500 lot, and retail demand has absorbed this quota sooner than expected.

Graham is behind in its deliveries even though it is assembling about 200 units a day.

WHETHER labor trouble which broke out late last week, principally in Toledo, O., and Racine, Wis., affects Detroit directly, and is the evil which automobile manufacturers have been fearing for some time, may develop this week.

The Toledo difficulty, centering in the Spicer Mfg. Co., Bingham Stamping Co., Logan Gear Co. and Electric Auto-Lite Co., appears to have been fomented by the automobile workers' union, which has been active in organizing manufacturing and assembly department employes in Detroit.

Indirectly, the flow of parts to Detroit automobile manufacturers is affected and it complicates the situation which has been exasperating since December, on account of delays resulting from the strike of tool and die makers.

Late Friday it appeared that about 8000 workers at Toledo would be affected. At the Nash and J. I. Case plants in Racine, Wis., about 1700 men went out.

Demands of employes are the right to organize their own union, a payday every Saturday instead of every second Saturday, a minimum of 65 cents an hour instead of 40 for common labor, and the 40 to 50 cents now paid for skilled labor.

Died:

THOMAS PARROCK, 81, former superintendent of the Republic Iron & Steel Co. in the Youngstown, O., district, and first president of the Youngstown Foundry & Machine Co., in that city, Feb. 20. Born in Staffordshire, England, May 15, 1852, he emigrated to America in 1880, serving a year at Catasauqua, Pa., as roll turner, and later removing to Youngstown, where in 1884 he was named superintendent of the hoop and cotton tie mills of Cartwright, McCurdy & Co.

He continued with this company's successor, the Union Iron & Steel Co. In 1900 he was appointed valley district superintendent of the Republic Iron & Steel Co., serving eight years. He became first president of the Youngstown Foundry & Machine Co. in 1886, continuing until 1907.

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Thomas W. Kiley, 69, president of Thomas W. Kiley & Co. Inc., Brooklyn, N. Y., iron and steel jobbing company, in Milford, Pa., Feb. 14.

□ □ □

William M. Blackstone, 48, president of the Blackstone Mfg. Co. and a director of the Jamestown Malleable Iron Corp., in Jamestown, N. Y., Feb. 16.

□ □ □

George W. McIlrath, 50, for the past four years plant superintendent of the Gabriel Co., Cleveland, manufacturer of automobile accessories, in Cleveland, Feb. 16.

□ □ □

Frederick H. Lutzow, 55, president of the Western Bearings Co., Chicago, manufacturer of ball and roller bearings, at his home in that city, Feb. 17. His widow will succeed him as head of the company.

□ □ □

Eben C. Clarke, 86, vice president and director, Firth-Sterling Steel Co., McKeesport, Pa., in St. Petersburg, Fla., Feb. 22. He was also director of the Globe Wire Co., and the Pittsburgh Cold Rolled Steel Co.

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John Osmond, 75, superintendent of the James Smart plant of the Canada Foundries & Forgings Ltd., at his home in Brockville, Ont., recently following a long illness. He had been an executive of the company for more than 50 years.

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Thornton H. Bissell, 45, for the past 11 years advertising manager of the International Nickel Co. Inc., New York, at his home there recently. At one time he was associated with Thomas Maddocks & Co., Trenton, N. J., manufacturer of plumbing fixtures.

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Roy Berryman, 45, district sales manager at Detroit for the Detroit Seamless Steel Tubes Co., in Detroit, Feb, 11, after a brief illness. Born in Harrisburgh, Ont., he came to the United States 26 years ago, becoming identified with the steel industry at that time. He represented the Detroit company for the past twelve years, being named district sales manager about a year ago.

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Ernest W. Gilman, 66, vice president and general manager of the Ingersoll-Rand Co. of Canada Ltd., in Montreal, Que., Feb. 20. Originally with the Canadian Rand Drill Co., in 1912, when the Ingersoll-Sargent Drill Co. of Canada was merged with the former company to form the Ingersoll-Rand Co. of Canada Ltd., he was named vice president and general manager.

Production

(*Concluded from Page* 12)

one of its eight active open hearths for repairs, planning to resume with the eighth unit again this week. Corrigan, McKinney Steel Co. continues with 13, and National Tube Co., Lorain, with 10.

Wheeling: For the fourth successive week, steel ingot operations were at 69 per cent, this involving 27 out of 39 active open hearths. For this week, steel ingot operations will continue at 69 per cent.

Wheeling Steel Corp.'s Yorkville plant went on capacity operations last week.

St. Louis—Granite City Steel Co. has lighted another open-hearth furnace and recalled 400 workers. Production in its tin mill has been stepped up to capacity, and in the galvanizing and sheet mill departments further gains are reported.

Birmingham: Unchanged at 52 per cent, with 12 open hearths in operation. While no announcements have been made as to new business from railroads, there has been warrant for rail rolling right along.

Buffalo: Advanced 4½ points last week to 47 per cent, highest rate of the year, and operations are expected to reach 50 per cent this week. Eighteen open hearths are in operation, with the possibility of additional units coming into production early in March if demand holds up to the anticipated point.

¶Canadian output of steel ingots and direct steel castings in January was 60,787 tons, highest since May, 1931. Production in December was only 49,557 tons and in January, 1933, 40,766 tons. Pig iron output in Canada in January was 30,677 tons, against 38,612 tons in December, and 29,209 tons in January, 1933.

¶Algoma Steel Corp., Sault Ste. Marie, Ont., is now operating two turns.

Industrial Men in the Day's News

Howard N. Eavenson, New President, American Institute of Mining and Metallurgical Engineers

He designed and built 15 large coal preparation plants for a subsidiary of the Steel corporation.

Technical achievements won him the degree of doctor of engineering from the University of Pittsburgh.

He is chairman of a new organization which intends to market 52,000,000 tons of coal a year.

HOWARD N. EAVENSON, newly-elected president of the American Institute of Mining and Metallurgical Engineers, is essentially interested in coal but a man well-known to the iron and steel industry. As partner in the consulting engineering firm of Eavenson, Alford & Hicks, Pittsburgh, he has contributed materially to the science of fuel preparation and is designer and builder of 15 large coal preparation plants for the United States Coal & Coke Co., subsidiary of the United States Steel Corp.

Born in Philadelphia in 1874, he was educated at Swarthmore college, receiving the degrees of bachelor of science and civil engineer. Many years later the University of Pittsburgh conferred upon him the honorary degree of doctor of engineering in recognition of distinguished achievement in the technical and administrative phases of the coal mining industry.

Actively engaged in coal mining in West Virginia, Kentucky and Pennsylvania ever since 1895, Mr. Eavenson has numerous affiliations in the industry. He is chairman of Appalachian Coals Inc., a newly-formed selling organization, which, through 137 producers of high-volatile bituminous coal, proposes to market a total output of 52,000,000 tons a year. He is a president of two other coal companies and a director of the Pittsburgh Coal Co.

Prior to his election as president, Mr. Eavenson had been a member of the Institute for 33 years, a director for one term and a vice president from 1930 to 1933, inclusive.

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Arthur J. Ramsay has been elected vice president of the Pittsburgh Rolls Corp., Pittsburgh, subsidiary of the Blaw-Knox Co. He has been with the company for over 22 years, recently being sales manager.

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Fowler Manning, formerly president of L. C. Smith and Corona Typewriters Inc., has been appointed director of a special air conditioning division that has been formed in the American Radiator & Standard Sanitary Corp., New York.

□ □ □

James Foster Smith was elected a director of the Wellman Engineering Co., Cleveland, at the annual meeting of the company. Officers of the company were re-elected, as were other directors.

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H. D. Stalnaker, formerly representing Joseph Schonthal Co. at Pittsburgh, has been appointed manager of the Pittsburgh office to be opened by the Continental Iron & Steel Co., New York.

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Paul J. Myler, president of Canadian Westinghouse Co. Ltd., Toronto, Ont., has been elected chairman of the board to succeed the late H. H. Westinghouse. Mr. Myler will continue as president.

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Hugh E. Parker, general superintendent of the Birmingham Southern railroad, subsidiary of the Tennessee Coal, Iron & Railroad Co., has been elected president of the Birmingham, Ala., Traffic and Transportation club.

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W. I. Brockson, for ten years advertising manager of Steel Sales Corp., Chicago, is now associated with Commercial Advertising Agency, Chicago. He is immediate past president of the Engineering Advertisers' association.

□ □ □

Charles M. Niezer has been elected president of the Tokheim Oil Tank & Pump Co., Fort Wayne, Ind., succeeding Clayton O. Griffin, who has retired. L. N. Geise was re-elected secretary and named treasurer. Dr. R. M. Bolman was re-elected vice president.

□ □ □

W. E. Clow, president, James B. Clow & Son, Chicago, cast iron pipe manufacturer, recently awarded a bronze plaque to the National Cast Iron Pipe Co., Birmingham, Ala., for the company's safety record, only one lost-time accident being recorded there during the past year.

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Arthur H. Young, vice president in charge of industrial relations, United States Steel Corp., recently attended a foundry practice meeting of the Birmingham, Ala., chapters of the American Society of Mechanical Engineers and American Foundrymen's association, later inspecting plants of the Tennessee Coal, Iron & Railroad Co., subsidiary of the Steel corporation.

□ □ □

John D. Wise, who as noted in STEEL for Feb. 19 has been elected executive secretary of the Foundry Equipment Manufacturers association, formerly was assistant sales manager of the Osborn Mfg. Co., Cleveland. Before the war he spent two years with the Robbins & Myers Co., at the company's Springfield, O., and St. Louis divisions. He became connected with the Osborn company in 1921.

□ □ □

Robert E. Allen and A. M. Andrews, New York; William P. Barba and Nicholas G. Roosevelt, Philadelphia; Warren H. Farr, Detroit; and Otto Mueller, Oxford, England, have been re-elected directors of the Budd Wheel Co., Philadelphia.

Herbert R. McIlvaine and William B. Reed, Philadelphia; Robert D. Campbell, Pittsburgh, Mr. Allen and Mr. Barba have been re-elected directors of the Edward G. Budd Mfg. Co.

EDITORIAL

Ordinary Industrial Companies Need Friend in Washington

FROM recent public and private utterances of persons high in authority in the government, it is apparent that the present administration has acquired a dangerously distorted view of American industry. Until the official opinion is corrected to conform with facts, innocent companies will remain in constant threat of unwarranted persecution.

This unfortunate condition is the outgrowth of a sequence of unusual developments and not the result of a deliberate plan. When the new administration assumed control of the government a year ago, its Chief Executive rightly assumed that he had been given a mandate by the people to clean house. In his interpretation of this implied duty, he arrived at the conclusion that many of the abuses of the recent past lay at the door of finance.

Almost from the moment of his inauguration, the President has criticized and rebuked the "money changers." Senate investigations which brought forth evidence of reprehensible conduct on the part of certain prominent financial executives served to strengthen the President's hand. Gradually the administration acquired a complex against anything and everything which could be related directly or indirectly with Wall street. Numerous suspicious forms of financial chicanery were placed in the category of Public Enemy No. 1.

Administration Generalizes from Flagrant Cases; Penalizes Innocent with Guilty

Up to this point the administration was on solid ground. The evidence of guilt was so overwhelming that the public enthusiastically approved the President's attempts to correct financial evils. Unfortunately, however, the zeal for punishment created a state of national emotion in which the administration and the public—probably in equal degree—ignored the fundamental of fair play. They made the grievous mistake of generalizing. When they found a crooked banker, their zeal for retribution caused them to inflict hardships on all bankers—good and bad alike.

This indiscriminate attempt to correct known evils threatens to injure many innocent industrial companies. In line with its well known complex against all things financial, the government unconsciously is forming its opinion of industry from financial considerations. Its approach to the majority of industrial problems is from the angle of stock ownership, banking connections, holding companies, etc. It is talking more and more about watered stock, unduly high profits and other similar factors closely associated with the financial side of business.

The pity of this, insofar as the iron, steel and metalworking industry is concerned, is that the evils to be corrected cannot possibly exist in more than a handful of companies, while the corrective measures adopted would inflict unnecessary hardships upon the great majority.

Present Attitude of Government Shows Small Regard for Ordinary Companies

For instance, there are roughly 27,000 companies in the iron, steel and metalworking industry. Assume that the government undertakes a measure or measures intended to correct abuses of holding companies. Among the 27,000 are probably not more than 1000 concerns operating under organizations embracing holding companies. Among the several hundred members of the steel code, not more than a score could possibly qualify as being identified with holding companies. The proportion in other branches of the industry would be even lower.

In other words, the great majority of companies have no intricate financial set-up. Their relations with banks are largely those of an ordinary depositor and borrower. In many cases their stock is closely held. The number whose stocks are listed on exchanges is small in relation to the total.

The present attitude of the government reveals scant regard for the rights of these companies which have remained free from financial domination. The securities act, the pending national securities exchange bill and other proposed legislation, while intended to impose certain restrictions upon the larger companies, in reality will inflict grave hardships upon a large number of small enterprises.

The situation would be helped considerably if the official minds in Washington could be given a clearer picture of what is comprised in American industry. The present conception of industry as a collection of thousands of plants all directed by push-button control from desks in Wall street is absurd. The great majority of companies having no intricate alliances either with Wall street or with stock exchange or bank control anywhere deserve more intelligent treatment at the hands of the government than is indicated in the present trend of corrective legislation.

THE INDUSTRIAL DIAL

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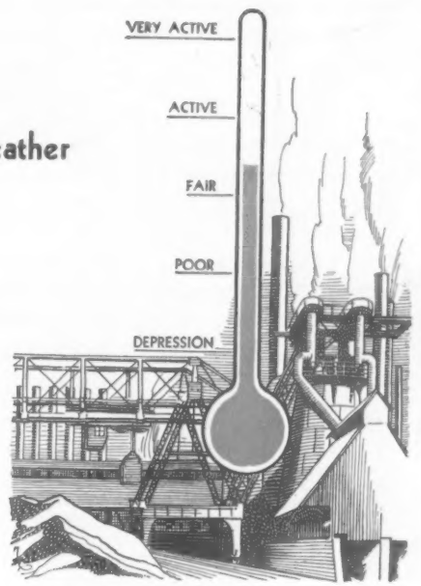
IN A week the "new deal" will be observing its first anniversary. The event doubtless will bring forth a parade of statistical comparisons of the condition of the country before and after.

Industrial executives share varying opinions as to the net effect of Rooseveltian policies upon business. At one extreme are those who believe that his "new deal" has saved them from disaster. At the other end of the line are those who think that the new order has been ineffectual and imposed impossible burdens.

The truth is somewhere between these two extremes. A study of trends in the United States and Canada affords a rough indication of how the "new deal" has influenced business:

Industrial Weather



TREND:

Upward

	Industrial Production		Industrial Employment	
1933	Canada	United States	Canada	United States
Jan.	62.2	59.8	78.5	56.6
Feb.	60.9*	59.9	76.8	57.5
Mar.	62.5	58.1*	76.9	55.1*
Apr.	65.1	63.8	76.0*	56.0
May	72.7	77.1	77.6	58.7
June	79.8	91.0	80.7	62.8
July	82.6	96.8†	84.5	67.3
Aug.	89.5	91.2	87.1	71.6
Sept.	90.2†	80.4	88.5	73.9
Oct.	87.4	73.6	90.4	74.0†
Nov.	83.9	69.0	91.3	71.4
Dec.	85.1	68.8	91.8†	70.1
Average	76.8	74.1	83.3	64.6

*Low point of year. †Peak of year.

The above index numbers on production and employment are comparable in that the base in both series in both countries is 100 as the average for the year 1926. Note that in Canada, where recovery has developed without the stimulus of gigantic government underwritings, the duration of the upward trend in production and employment was longer than that registered in the United States. However, the rate of gain from low to high was greater in the United States than in Canada. The ratio of low point to peak in production was 66.6 per cent in the States compared with 48.1 per cent in the Dominion. The gain from low to high in em-

The Barometer of Business

Industrial Indicators

	Jan., 1934	Dec., 1933	Jan., 1933
Pig iron output (Daily average, tons)	39,426	38,456	18,348
Machine Tool Index	103.6	92.0	33.1
Finished steel shipments (tons)	331,777	600,639	285,138
Ingot output (Daily average, tons)	73,959	72,786	39,618
Dodge Bldg., awards in 37 states (sq. ft.)	.....	11,451,500	8,453,000
Automobile output	*165,000	87,307	133,472
Coal output, tons	32,935,000	29,600,000	27,060,000
Business failures; number	1,364	1,132	2,919
Business failures; liabilities	$32,905,428	$27,200 432	$79,100,602
Cement production, Bbls.	.....	3,526,000	2,958,000
Cotton consumption, bales	508,000	348,000	471,000
Car loadings (weekly average)	544,390	513,090	477,624

*Estimate

Foreign Trade

	Jan., 1934	Dec., 1933	Jan., 1933
Exports	.....	$192 000,000	$120,589,000
Imports	.....	$133,000,000	$96,006,000
Gold exports	.....	$10,815,000	$14,000
Gold imports	.....	$1,687,000	$128,465,000

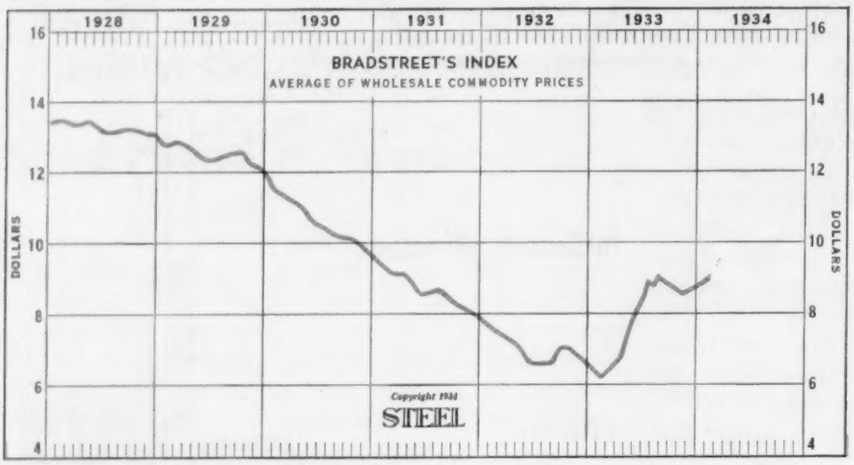
Financial Indicators

	Jan., 1934	Dec., 1933	Jan., 1933
25 Industrial stocks	$142.28	$137.01	$90.50
25 Rail stocks	$37.18	$33.04	$22.48
40 Bonds	$76.62	$71.96	$66.60
Bank clearings (000 omitted)	$17,740,951	$16,439,217	$19,949,176
Commercial paper rate N. Y., per cent)	1½	1½	1½
*Commercial loans (000 omitted)	$4,740,000	$8,402,000	$12,935,000
Federal Reserve ratio, per cent	63.9	63.9	65.6
**Railroad earnings	$37,763,877	$37,565,822	$32,856,893
Stock sales, N. Y. stock exchange	54,567,209	34,877,616	18,719,502
Bond sales, per value	$440,984,700	$297,255,500	$263,030,600

*Leading member banks Federal Reserve System.
**December, November and December respectively.

Commodity Prices

	Jan., 1934	Dec., 1933	Jan., 1933	Monthly Av., 1913
STEEL's composite average of 14 iron and steel prices	$32.42	$32.42	$28.68	$26.32
Bradstreet's index	$9.01	$8.83	$6.53	$9.21
Wheat, cash (bushel)	$1.06	$1.02	66c	92c
Corn, cash (bushel)	66c	63c	40c	51c
Petroleum, crude (Bbl.)	98c	98c	42c	$2.50



	1934	1933
February 1	$9.01	$6.53
January 1	8.83	6.79
	1933	**1932**
December 1	$8.81	$6.88
November 1	8.84	6.96

ployment was 34.3 per cent here, as against 20.8 per cent for our northern neighbor. The relation of the gain in employment to the gain in production was 51.5 per cent for the United States and 43.2 per cent for Canada.

This shows that NRA, PRA, PWA, CWA, etc. gave a slightly greater impetus to employment than the more natural forces at work in the Maple Leaf dominion. Nevertheless the more stable trend in Canada reflects a more wholesome condition; the country is not encumbered with the terrific future consequences which are entailed in our own experiment.

In view of the foregoing, one may ask whether our policy of adding the burden of idealistic reform to the burden of pump priming for recovery is justified.

Where Business Stands

Monthly Average, 1933—100

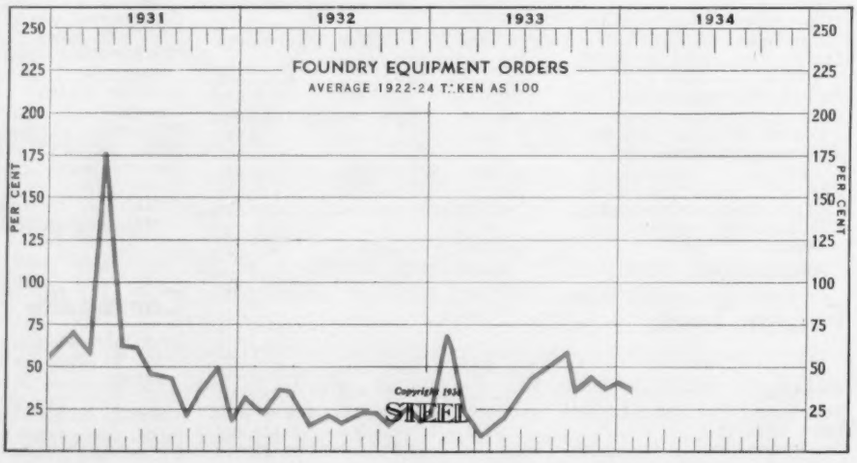
	Jan., 1934	Dec., 1933	Jan., 1933
Steel Ingot Output	100.2	98.6	53.7
Pig Iron Output	108.9	106.1	50.7
Freight Movement	97.7	92.1	85.8
Building Construction	.....	93.4	68.9
Automobile Output	97.8	51.8	79.1
Wholesale Prices	114.6	112.3	83.0

Commodity Price Index Advances 38 Per Cent From Year Ago

Bradstreet's index of wholesale commodity prices continues to show a rising trend. On Feb. 1, 1934 it stood at $9.01 compared with $8.83 on Jan. 1, a gain of 2.0 per cent. When compared with $6.53 on Feb. 1, 1933, the current position represents a gain of almost 38 per cent. With the exception of the Oct. 1, 1933, figure, the latest index is at the highest level since April 1.

Foundry Equipment Orders Decline in January

The demand for foundry equipment declined slightly in January, according to the monthly report of the Foundry Equipment Manufacturers' association. The index of gross orders during the month was 37.2, which compares with 43.8 in December, 1933 and 68.4 in January a year ago. Since September, when gross orders declined to 34.9 per cent the trend has varied within a narrow range.



	Per Cent
January, 1934	37.2
December, 1933	43.8
January, 1933	68.4

Special Furnaces Built for Heating Bolt, Nut Stock

BY J. B. NEALEY

WHILE machines for bolt and rivet heading, nut making, threading and tapping are fairly well standardized, considerable variation still exists in the metallurgical phase of this industry. Furnace design, combustion equipment and heat treating technique are handled differently by different manufacturers, with many interesting results.

Manufacturing a complete line of bolts, nuts and rivets, and in addition producing a variety of forgings, notably track supplies and poleline hardware, the Oliver Iron & Steel Corp., Pittsburgh, has developed a number of individual practices worthy of reporting.

Frog and switch bolts of high physical characteristics are produced from a high-carbon high-manganese steel which is given a double heat treatment, differing from the practice in some plants of quenching on the forging heat and depending upon heat retained in the core to draw the surface section to the desired hardness. By the double method the bolts are heated, quenched cold and drawn in separate furnaces at carefully controlled temperatures.

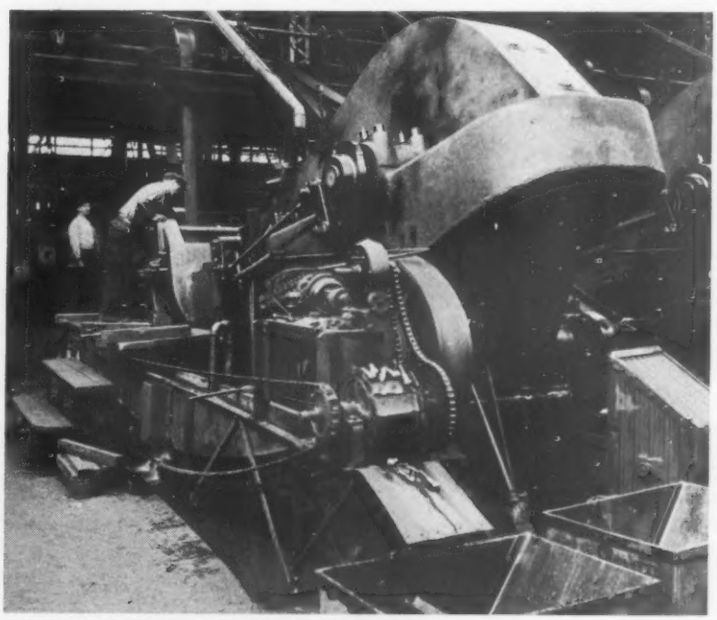
The usual run of bolts is forged at 1700-1900 degrees Fahr., depending upon size. They are either roll threaded or cut threaded and are heat treated only when physical strength in excess of 60,000 pounds per square inch is required.

On the other hand, frog and switch bolts, while heated at the same temperatures, are allowed to cool in air and the threads cut cold. They are then reheated to above the critical temperature for a period of 20 to 25 minutes, quenched and drawn as described previously. Resulting approximate physical characteristics are: Tensile strength, 140,000 pounds per square inch; elastic limit, 115,000 pounds per square inch; elongation in 2 inches, 20 per cent; and reduction of area, 48 per cent.

In the track bolt division is a row of units, each comprising forging furnace, heading machine, two thread rolling machines, continuous quench and a drawing furnace. Bolts made here range from ⅞ to 1½ inches in diameter and 4½ to 8 inches long. Forging furnaces are of the usual brick, refractory and steel construction, each 30 feet long, 8 feet wide and 5 feet high. Gas fuel is used and is underfired through 16 gas burners on each furnace, eight to a side. Burners on most of these furnaces are of the nozzle mixing type, both gas and air being supplied at 6-ounce pressure.

One furnace is provided with low-pressure inspirator type burners and automatic temperature control of the potentiometer type. As pressure air from a separate blower inspirates gas at zero pressure the control valve is cut into the air line. Raw material is 26-foot bars which are heated in the furnace and then fed into the dies of the headers by sets of feed rolls.

The machines automatically head, finish, trim and shear the bolts to length at an average rate of 3000 per hour. The hot bolts drop onto a short conveyor which feeds them into one of two roll threaders. This conveyor is a V-shaped trough with a moving endless chain in the bottom. Another similar conveyor receives the threaded bolts and dumps them onto the quench tank conveyor. The latter is 20 feet long and 9 inches wide and is suspended



ONE of a battery of automatic bolt heading and roll threading machines. Desired hardness is obtained by quenching on the forging heat in the tank at the left, provided with slat-type conveyor

SPECIAL - ANALYSIS bolts are heat treated in separate tilted gas fired furnaces provided with quench tank and slat-type conveyor for discharging quenched material

loosely between pulleys so that it hangs down and travels through the quench tank. The lower half of this conveyor returns below the quench tank. If it is not desirable to quench a particular run of bolts the quenching medium is simply drawn off the tank.

For bolts receiving special heat treatment several furnaces are provided, each 10 feet long, 5 feet wide and double chambered. These units stand on legs and are sloped at a slight angle. V-shaped heat-resisting alloy guides are laid on the hearths so that the work will slide or roll through by gravity. Each chamber of each furnace is heated with a single gas burner located in the charging end and overfiring the work. The hot bolts are discharged into a quench with the same type of previously described conveyor. In this case, however, there are two quenches, one for water and one for oil, either to be used according to the steel analysis and physical characteristics desired.

One of the most interesting types of forging furnace designed for selective heating and mechanical operation was developed and patented by the company. It is of the usual slot type and of brick and steel construction except for two hollow cast iron blocks set in the front of the furnace with the slot between them. Cold water circulates through these blocks and only as much of the steel stock as it is desired to heat is allowed to protrude into the furnace. That portion of the steel which must be kept cold for the gripper of the header lies directly between the two water-cooled blocks.

Slot Size Adjustable

There are a number of these furnaces, each 7 feet long (along the slot) and 2½ inches deep, heated by four gas burners located in the upper portion of the backwall so as to fire directly upon the protruding ends of the bolt material. One of the cooling blocks is adjustable so that the size of the slot can be regulated to suit any diameter of material up to 1⅛ inches. The furnace design will permit heating stock up to 32 inches in length. The adjustable slot opening also prevents creeping or buckling of the steel pieces as they pass through the furnace.

The entire bolt making unit—shearing, heating and heading—is automatic and continuous in operation, the furnace being hopper fed and equipped with a motor-driven pusher which moves the steel pieces along the slot and through the heating zone. Summarizing the sequence of operations, steel rods first are cut to length in a multiple shear and piled in a fixture with a drop bottom. This is moved, by overhead monorail conveyor, to the furnace and the blanks dropped into the hopper. As they emerge from the furnace with one end hot they are fed automatically into the header from which they are discharged upon a belt conveyor which dumps them into containers at an average rate of 1000 per hour.

The hot nut division includes lines of long furnaces and machines, the raw material coming in lengths of 10 or 12 feet. Furnaces are of the slot type, 8 feet long and 5 feet deep.

HOPPER-FED, slot-type forging furnace with mechanical pusher which feeds heated stock into bolt heading machine at the left. Water-cooled cast iron blocks keep one end of the stock cool for header grippers

About 3½ feet of the stock is heated before placing it into the nut machine. These furnaces are fired by burners located in the end, arranged to fire toward the center and parallel with the slot. As the nuts are ejected from the automatic nut machines they fall into a long V-shaped trough with an endless chain conveyor in the bottom which carries them to containers.

An improved method of firing galvanizing pots also has been developed in this plant. Two large pots are used, 12 and 25 feet in length, respectively, as well as several smaller ones. Heretofore, galvanizing tanks or kettles have been heated from the bottom but the designers of the above tanks took into consideration the fact that all of the cold metal was introduced at the top, the cold work entered at the top, quantities of cold air always were in contact with the top surface of the liquid metal, resulting in high heat loss through black-body radiation from this surface.

This led to the conclusion that the heat was needed most in the upper part, rather than at the bottom, so the burners were set about a foot and a half below the top. Heat is supplied by gas burners, of the inspirator-impact type, cemented into the outer furnace walls. In front of each burner is a small chamber, built directly into the wall, at the bottom of which is a bed of refractory material.

Burners fire directly upon these refractory beds, bringing them up to incandescence. The hot products of combustion are drawn over a low bridge wall and down the sides and bottom of the kettle to a common duct, running the entire length of the tank, to a stack. Radiation from the refractory beds promotes complete combustion in the shortest space and quickest time.

While the furnace walls facing the kettle become radiant and radiate a large quantity of heat to the kettle walls, most of the heat is supplied by convection, due to the fact that the distance between the furnace and kettle walls was arranged to provide the maximum velocity for the products of combustion passing through. This method provides noteworthy savings in fuel, labor and dross accumulation, increases production and tank life and improves the quality of the product.

GREATER economy in galvanizing is obtained by arrangement in which burners fire upon refractory beds near the top of the kettle. Heat is by convection and radiation

Develops New Process for Hardening Iron Castings

A process called Electriding, which consists in converting the surface structure of malleable or gray iron into a hard carbide structure, has been developed by the Gunite Foundries Corp., Rockford, Ill. It is claimed that Rockwell hardness C42 to C45 and brinell hardness of 350 to 375 are obtained.

The feature of the process, for which patents are pending, consists of obtaining this hardness to depths of 1/16 to ⅛ inch without changing or destroying the malleability of the cast structure directly underneath the hardened area. The process is said to be relatively inexpensive and can be used to reduce maintenance costs in many industrial fields. It can be used in connection with any castings containing temper or graphitic carbon as found in gray and malleable iron.

Four trunk line railroads are using malleable brake heads treated by the process. Convevor buckets also are in use with sides and edges protected by the treatment.

Symposium on Corrosion at A. S. T. M. Regional Meet

A symposium on the outdoor weathering of metals and metallic coatings will be a feature of the 1934 regional meeting of the American Society for Testing Materials to be held at Wardman Park hotel, Washington, March 7. This symposium is being sponsored jointly by committee A-5 on corrosion of iron and steel and committee B-3 on corrosion of nonferrous metals and alloys.

Four technical papers are scheduled for presentation as follows: "Outdoor Test Results on Bare and Metal-Coated Ferrous Specimens," by C. D. Hocker, chemical engineer, Bell Telephone Laboratories Inc.; "How Soon Is It Safe To Draw Conclusions?—A Discussion of the Early Interpretation of Test Results in the Atmospheric Corrosion of Nonferrous Metals and Alloys," by W. H. Finkeldey; "Galvanic Corrosion by Contact with Dissimilar Metals," by C. L. Hippensteel; and "The Harmony of Outdoor Weathering Tests," by R. F. Passano.

The regional meeting is being arranged in connection with the annual spring group meeting of standing committees to be held at the same place, March 5-9.

Announces Fourth Congress For Applied Mechanics

In accordance with the resolution adopted in Stockholm in 1930, the Fourth International Congress for Applied Mechanics will be held in Cambridge, England, July 3-9. Subjects to be discussed will be grouped under four general headings: Rational mechanics, including vibrations of structures and machines; mechanics of fluids; materials, including elasticity, plasticity, fatigue and crystal structure; and water waves.

The applied mechanics division of the American Society of Mechanical Engineers is co-operating with the the committee with the idea of coordinating the participation of other American groups in this congress. Inquiries should be addressed to the society at 29 West Thirty-ninth street, New York.

Internal Grinding Performed By New Chuckless Method

A CENTERLESS holding principle is incorporated in a new machine just placed on the market by the Heald Machine Co., Worcester, Mass., for internal grinding of small parts. The machine was developed originally for centerless grinding of roller bearing races, in which application the required tolerance was within 0.0001-inch. This unit, described briefly on Page 40 of this issue, also features automatic operation.

Three rolls—regulating, pressure and supporting—controlled hydraulically with a loading and supporting arm and work guide, are the key units in the centerless internal principle. As shown in the accompanying illustration, the supporting roll is fixed below the work, while the pressure roll, mounted on a swinging bracket, keeps the workpiece in contact with the other two rolls. The regulating roll, probably the most important working unit, drives the work and also regulates its speed, thus preventing the workpiece from turning at too great a speed in relation to the grinding wheel.

The work is held between the three rolls and rotates on its own outer surface. When the piece is ground to size, the loading arm swings upward, ejects the finished work, and, at the same time, brings down another workpiece for grinding. When the workpiece is less than 1¼-inch outside diameter, a solid supporting blade instead of a supporting roll is employed because of space limitations.

Maximum Support Provided

The three rolls are arranged so that the grinding wheel bears directly against the inner surface of the work and directly in line with the point of contact of the work with the regulating roll. This gives a maximum of support to the work, assuring efficiency in stock removal since wheel action is not affected by spring in the workpiece. Contrary to usual practice, the wheel and work rotate in the same direction.

There is no fixed position for the axis of rotation of the work, consequently pieces having different outside diameter each have different axes of rotation. The arrangement of the machine parts, notably the rolls and the hydraulically controlled workhead spindle, results in uniform wall thickness, which is governed at all points by the distance between the grinding wheel and the regulating roll. Work can be rechucked without change in location, as for example, in grinding in two or more operations or in roughing and finishing. Holes can be ground either straight or tapered.

The automatic grinding cycle includes a pick-up feed, roughing, semi-finish, wheel truing, finish, spark-out and automatically sizing. With the work in place, the table carries the piece up to the wheel. The wheel, about to enter the hole, backs away from the work surface and by a pick-up feed comes into contact with the surface with a plunge cut. This plunge cut prevents breaking down the corner of the wheel and also is an aid when an irregular amount of stock must be removed. Change to a proper roughing feed removes the larger amount of stock, the reciprocating table having the correct roughing speed. The feed changes to finishing speed at a predetermined point, relieving spring and strain from the spindle before truing the wheel.

Procedure for Truing

As the wheel is trued, all feed stops, the wheel receding as the hole size is nearly finished. Work withdraws from the wheel and the diamond drops into position, the wheel is trued and again backs away from the surface before it re-enters the hole. The wheel and table then go into a finishing speed and when an extremely fine finish is desired a sparkout may be included in the grinding cycle when the feed is practically nil. To eliminate bell mouthing and scratches to the finish when the wheel backs off as the required internal diameter is reached the work withdraws to rest.

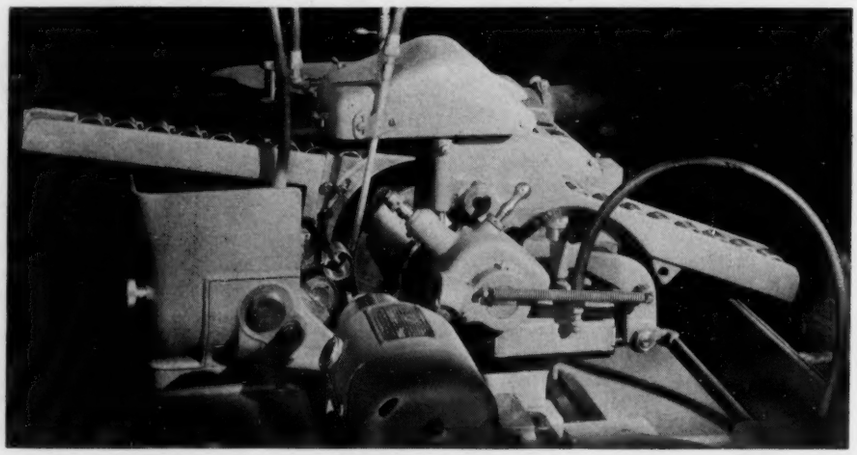
The grinding cycle completed, the finished piece is ejected and the loading arm allows another piece to drop from the work chute. This machine assures concentricity of bore with the outside diameter of the work piece within 0.0001 inch.

Two methods for locating the work consist of: Locating and squaring up from the outside diameter; and locating from the outside diameter and squaring up with the back face. When locating and squaring up workpieces from the outside diameter, lands on the rolls are slightly less than the width of the workpiece, but when squaring up with the back face, the lands on the rolls are narrow so that they do not have any great tendency to square up the workpiece. To hold the workpiece against the backing plate, the pressure and regulating rolls are skewed to force the workpiece toward it.

Setup with Plug Gages

To set up a machine using plug gages, a finish ground workpiece is slipped over the gages and the rolls are adjusted to contact with the outside diameter. For a machine using the taper bore principle of size determination, a special plug having a portion of its length ground to the same diameter as the outside diameter of the workpiece is used. Working surface of the rolls becoming worn must be reground. The regulating roll usually is ground in place using the same wheelhead as is used for the work. The rest and pressure rolls are removed as units and ground on their own bearings in a plain grinding machine.

The loading cycle starts after the finished workpiece leaves the wheel and is controlled by a hydraulically-actuated mechanism which is interlocked with the table movements in such a manner that it is impossible for the table to start toward the wheel until the cycle is complete. This prevents damage to the machine and possible injury to the operator in case



In this close-up view of the chuckless internal grinding machine, the regulating, pressure and supporting rolls are shown holding a workpiece ready for the wheel to enter the bore

a workpiece should become jammed.

When a workpiece is finished, the table runs out to loading position where the work is ejected from the machine and a new workpiece is positioned for grinding by the loading arm. The arm moves in a clockwise direction and discharges the finished workpiece over the regulating roll at the same time a cam on the loading arm shaft actuates a work stop which allows an unfinished workpiece to leave the loading chute.

The workpiece leaving the chute first rests on the back surface of the loading arm and as the arm moves in counterclockwise direction the workpiece finally drops upon the regulating roll and into position on the rest roll.

Cam Controls Pressure Roll

As the loading arm starts in its clockwise movement, a cam on the loading arm shaft causes the pressure roll to move away from the workpiece so that it can be ejected from the machine and a new piece placed in position after which the pressure roll returns to its original position where it is held by adjustable spring pressure.

Regulating wheel speed generally is fixed. As it drives the work by its outside diameter, different workpieces having the same general proportion between the bore and outside diameter all will run at approximately the same surface speed. Speed of the regulating wheel is altered by changing pulleys.

The cross feed mechanism is hydraulically actuated whereby a smooth, continuous feed is imparted to the grinding wheel at any rate suitable for the work being ground. An automatic reducing valve maintains a constant low working pressure at the feed valves irrespective of the changes in the high-pressure line. By making this mechanism independent of the table, reciprocating speed of the table and feed of the wheel can be adjusted to the proper combination for obtaining accuracy, finish and production.

Economies Effected By Gas Analysis

SEVERAL installations of new automatic gas analysis apparatus applied to open-hearth furnaces, blast furnaces and reheating furnaces have provided performance data which have lead to modifications in operating practice. The instruments offer possibilities in connection with other fuel burning equipment.

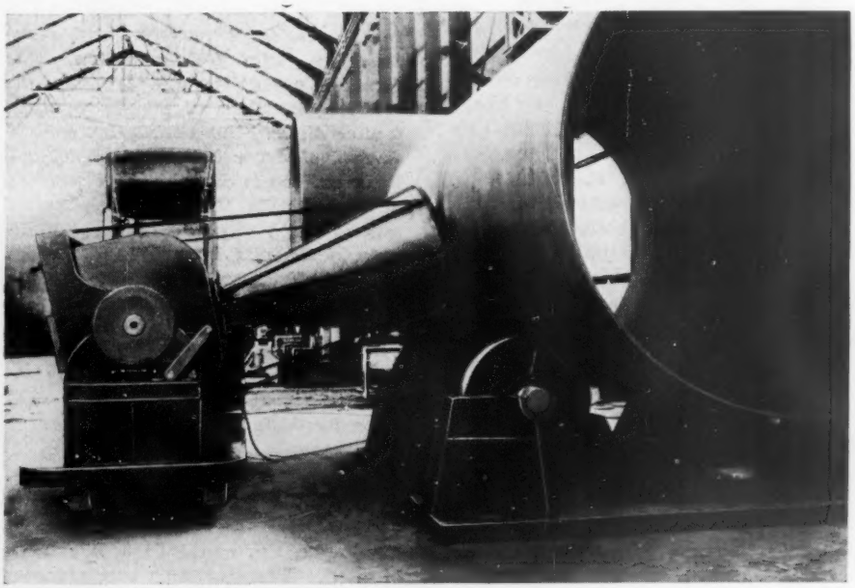
A middle western steel company, which installed one of these recorders for oxygen on an open-hearth furnace, found that the exhaust gas from the down-take averaged 3.5 per cent oxygen. Since then, experiments in the regulation of the damper and the amount of fuel have led to the development of a practice in which the recorder chart shows a continuous average oxygen content in the exhaust gases of 0.8 per cent. The consumption of fuel in this open-hearth furnace has been reduced approximately 10 per cent as a result of the improved control.

Another middle western steel company has been aided in determining the most efficient methods of blast furnace control by installing one of these recorders which shows carbon dioxide, carbon monoxide and hydrogen on one chart. Experiments in manipulation of the controls at this blast furnace are resulting in almost complete uniformity of analyses in the blast furnace gases. The charts on this recorder show close averages during a run of 17 per cent carbon dioxide, about 26 per cent carbon monoxide and about 4 per cent hydrogen.

Used on Reheating Furnace

The same kind of an instrument has been installed with success on a reheating furnace in the middle west. It records the percentages of carbon dioxide and carbon monoxide, plus hydrogen in the gas after combustion and the study of control which has thus been made possible has resulted in a saving of approximately $14 a day in the operation of this furnace.

These instruments are manufactured for similar use on other heating units such as stoves, gas producers and gas engines. The installations described were made by the C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.



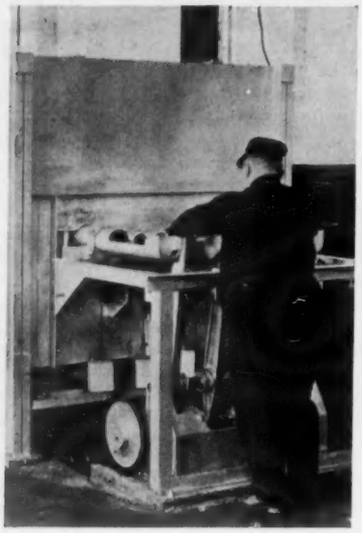
PEERING THROUGH FOUR INCHES OF STEEL: What appears to be a large-sized edition of an old-fashioned talking machine is actually one of industry's most modern tools—the completely shock-proof X-ray apparatus which is being used to examine more than 75 miles of welded steel seams in the penstocks of Boulder dam. Built by the General Electric X-Ray Corp., Chicago, the equipment is rated at 300,000 volts. The "megaphone" prevents the spread of the X-rays

Announces New Electrode For Welding Cast Iron

An electrode for welding cast iron by the shielded arc process is announced by the Lincoln Electric Co., Cleveland. This electrode, known as "Ferroweld," is said not only to simplify welding procedure on cast iron, but to produce a weld with greater strength and ductility than the cast iron.

The new electrode has a steel core surrounded by a heavy flux coating which protects the arc from gases injurious to the weld which are present in the atmosphere. One of the principal advantages claimed is the remarkably low heat with which it can be used, thus reducing possibility of cracking. The electrode is manufactured in only one size—⅛-inch, and is used with approximately 80 amperes of current.

Welding is done intermittently, not over a 3-inch bead being laid down at one time. As each bead is welded it is peened lightly, thoroughly cleaned and allowed to cool somewhat before the next bead is deposited. Because of the extremely low current with which it is used, the hardening effect along the line of fusion is reduced materially. Thus the weld is relatively easy to machine.



Making the Most *of* METHODS AND MATERIALS

PIPING systems for watering golf course greens, parks, cemeteries and similar tracts of land constitute an expanding and promising market for pipe. Because these systems must be leakproof, welded construction usually is adopted. Any standard new or used iron and steel pipe can be utilized; in some instances, a good and economical system has been attained through use of either redrawn or used boiler tubing. Galvanized pipe costs about 30 to 33 1/3 per cent more than black pipe and for this reason black pipe coated with a good pipe enamel applied hot is more frequently used. The cost of a piping system depends upon local conditions, but is relatively low.

$ $ $

Agricultural implements of all types including plow shares and disks, corn planter runners, subsoil teeth and grain pulverizer hammers have been found to have much longer life when hardfaced.

$ $ $

Chromium plated dies have been used with considerable success in drawing mild carbon steel. In some instances, dies which operated unsuccessfully and caused scoring were made satisfactory by chromium plating. The plating presents a smooth surface with a low coefficient of friction. It has interesting possibilities for dies employed in forming and drawing stainless steel.

$ $ $

IT SEEMS entirely fair to conclude that the addition of columbium in moderate and economical proportions inhibits intergranular deterioration of the austenitic chromium-nickel steels when exposed concurrently to elevated temperatures and chemical corrosion. This enhancement of corrosion resistance does not require sacrifice of the present valuable properties. Susceptibility to intergranular corrosion has limited use of these steels in logical fields, and the proffered remedy of this defect is expected to give fresh impetus to industrial utilization.

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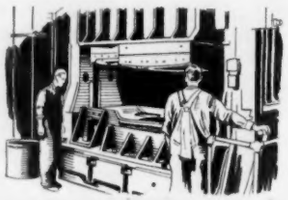
Application of nickel cast iron to die service was not long confined to the automotive industry since manufacturers of metal parts of many types quickly recognized the advantages offered by the improved material. It is now in use in the production of a wide variety of sheet metal parts, and its ability to assume and maintain a high polish is reflected



in a freedom from galling or streaking of the metal formed. An example is the use of such dies in the production of monel metal sinks. In making these sinks, the matter of finish is of such extreme importance that even a minor blemish will not be tolerated. The highly developed and uniformly hard structure of the alloyed cast iron has enabled it to meet this and similar stringent requirements satisfactorily.

$ $ $

A cast-steel brake drum developed especially for use with steel or iron brake shoes is produced by a West Coast manufacturer. It is designed with peripheral fins on the outer surface to increase the area contacted by the air and thereby dissipate rapidly the heat which is developed in metal-to-metal brakes. It is reported to give a very smooth braking action, comparable to that of molded brake linings used with cast-iron drums. The material is a nickel-chromium-molybdenum steel with a tensile strength of 95,000 to 105,000 pounds per square inch. This steel shows excellent wear resistance in brake service and, like other cast nickel steels, is sufficiently tough to withstand any unusual strain or shock that may be encountered in operation. Many of these steel brake drums have been in service well over 100,000 miles on trucks, buses and trailers.

$ $ $

TO PRODUCE dense, solid steel castings and reduce feeding difficulties, one foundry employs a centrifugal process placed in operation immediately after the castings are poured. It consists of a large motor-driven table on which the molds are placed with the gate sides forming the inner portion. The molds are filled rapidly by several pourers, and then rotation of the table is begun. Speed is approximately 50 revolutions per minute and the time 5 or 6 minutes.

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Important properties of a good quenching oil are its mobility, ability to increase heat transfer, and resistance to sludging or oxidation. The function of cutting and drawing oils is the prevention of pick-up between tool or die and the work. One well-informed observer believes that difficulty in cutting is due chiefly to welding of the chip to the tool. Sulphurized oils do much to prevent this. Sulphochlorinated oils have been developed to neutralize the wear effect on tools and at the same time to preserve excellent finish. Activity of sulphur in sulphurized petroleum oils is greater than in fatty oils, thus increasing the anti-weld properties, but at the same time decreasing resistance to wear.

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Stresses developed in enamel coatings, as they cool subsequent to fusion upon the metal base, are being studied. Tests of 800 specimens of 11 typical first-coat enamels indicate that the tensile strength varies by about 25 per cent, while the modulus of elasticity varies by about 5 per cent. The computed maximum elongation before tensile failure is slightly over 0.25 per cent.

The Plastic Forming Of Metals

By PROFESSOR DR.-ING ERICH SIEBEL
Translated by JOHN H. HITCHCOCK

Part II—Forces and Flow of Material in Technical Forming Processes

7. Force Requirement for Piercing (Continued)

OBSERVED variation of specific mandrel pressure therefore appears to be confirmed theoretically*. The fact that the specific mandrel pressure has a nearly constant value in the region which is particularly in question is important for the reason that it thereby becomes possible to carry out an aproximate calculation of the piercing force with the specific mandrel pressure assumed to be constant. As the foregoing computations show, the specific mandrel pressure used in these calculations, even without consideration of the forming losses, must be at least 2.1 times the deformation strength of the material, as determined by tensile or compressive tests at the temperature considered.

Mandrels Were Compared

In order to study the effect of shape of piercing mandrel upon the force requirement in piercing with axial displacement, the piercing tests reproduced in Fig. 102 were conducted. In these tests, mandrels having constant cross-sectional area of 0.388 square inch, and having both flat and round points, were compared. In addition, a slightly conical flat-faced mandrel of 0.388-square inch area at the point, the diameter of which increased 0.1-inch in 5 inches length, was brought into comparison. As Fig. 102 shows, the piercing process required the least force with a mandrel slightly rounded in front, although the difference in force requirement from that of the flat-faced mandrel was only small.

On the other hand, the force requirement with a mandrel point of hemispherical shape was about 20 per cent higher than in piercing with a flat-faced mandrel. The high force requirement of the hemispherical mandrel is attributed to the fact that in this case the displaced material remains under high pressure in the transverse direction, during the extensional movement between mandrel and die in the gradually diminishing annular crevice, so that it can flow out only under high external frictional losses. In contrast to this condition, the displaced material is not hindered from flowing out when a flat or slightly rounded mandrel is used. The piercing tests conducted with a conical mandrel show how disadvantageously this hindrance of outflow of the material can affect the force requirement. The mandrel pressure increases here, in the course of the test, to a value many times that of the pressure produced in ordinary piercing.

The proper contruction of the mandrel is essential if the force requirement is to be reduced to a minimum. Most favorable in this respect is the flat-faced mandrel or a mandrel with a slightly rounded point, whereas the use of a mandrel with a hemispherical point always appears to be disadvantageous. The last result stands in contrast to the observation of Hofmann[73] in piercing tests conducted on steel billets, insofar as the flat-faced mandrel appeared more favorable here only for the production of thin-walled hollow billets; while in thick-walled piercing the round-faced mandrel required smaller forces. In this connection, however, the great difficulties, which hinder exact comparative tests in hot working, should be considered. The unequivocal results of the small scale tests with soft lead show in any case that proof of this part of Hofmann's test series is desirable.

Lateral Tests Performed

Whereas piercing in the tests hitherto described was done exclusively with axial displacement, several tests were now carried out in which piercing with lateral displacement was performed. First, a round billet 1.57 inches long and 1.55 square inches area was pierced without lateral restriction, with a flat-faced mandrel of 0.388 square inches area. The force-travel diagram of the test is reproduced in Fig. 103. The billet was compressed during the test by about 0.118 inches. The wall thickness increased correspondingly from top to bottom. The piercing force increased gradually at first, and remained constant at 3300 pounds during the principal part of the piercing process. A gradual increase of the piercing force could be observed toward the end of the test, which is attributed to the compression and to the growing influence of the base. A comparison of this variation of force with that of the corresponding test for piercing with axial displacement, which is likewise shown in Fig. 103, discloses that the force requirement for piercing with free displacement

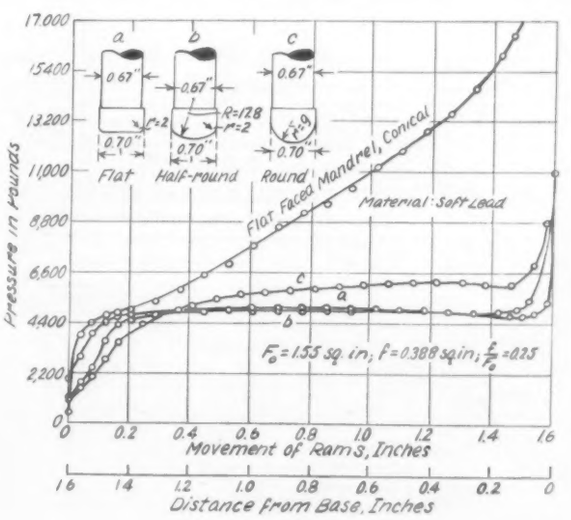

Fig. 102 — Influence of shape of mandrel on variation of force in piercing with axial displacement

*The observed phenomena provide an approximate comparison between the piercing process and the testing of hardness. In both cases, the resistance to penetration practically is constant over a wide range. The piercing test in a slightly conical die appears to be a suitable substitute for hardness tests of soft materials which are difficult to carry out. Relations between the determined resistance to penetration and the deformation resistance of strength of the material, similar to those known for hardness testing, can be expected here.

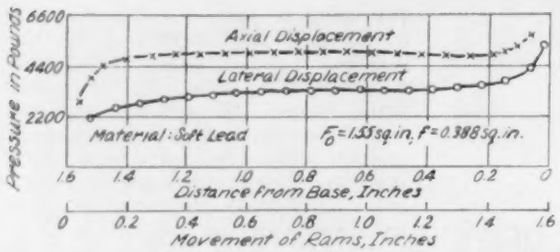

Fig. 103—Variation of force in free piercing

is only about two-thirds of that for piercing with axial displacement. The specific mandrel pressure decreases correspondingly from 12,800 to 8500 pounds per square inch. The deformation resistance, computed from the theoretical value of the deformation (32.2 per cent), is determined as 6680 pounds per square inch, or about 10 per cent higher than in piercing with axial displacement.

Relations Less Favorable

The relations are considerably less favorable when rectangular billets are pierced in a die by the Ehrhardt process. Tests of this sort were carried out with rectangular billets having chamfered edges, with initial areas of 1.162 and 1.24 square inches, using flat-faced and hemispherical mandrels of 0.388 and 0.310 square inches area respectively, so that the difference between die area and billet area corresponded to the area of the mandrel. The resulting force-travel diagrams are reproduced in Fig. 104, with the curves drawn for comparison which were obtained in piercing with axial displacement with the same piercing mandrels. In the piercing of rectangular billets, after an almost constant force at first, there is shown an abrupt rise of the piercing force toward the end of the test, to a value which agrees approximately with the force requirement for piercing with axial displacement. In the use of a mandrel with a hemispherical point, the described rise occurs somewhat later than in the tests conducted with flat-faced mandrels; which can be attributed only to the fact that the complete mandrel area lies at a corresponding distance behind the mandrel point.

The cause of the described increase of force can be sought in the fact that the process of forming by piercing produces a larger region of flow in front of the mandrel point. Correspondingly, in piercing with lateral displacement, a bulging of the billet can be observed even at a considerable distance ahead of the mandrel point; and a compression of the part of the billet lying directly in front of the mandrel occurs before the formation of the hole follows.

As Fig. 105 shows, the whole die is almost completely filled, by this bulging of the rectangular billet, when the mandrel point has approached to within a distance corresponding to the mandrel diameter from the base of the die. The last part of the piercing process, as was also observed by Hofmann[73] in his tests, therefore proceeds no longer as lateral-displacement piercing, but as piercing with axial displacement under correspondingly increased force.

The occurrence of the increase of force can be hastened in the piercing of longer billets, by the circumstance that a compression of the lower part of the billet is produced during the piercing process, by the mandrel force. The tendency in this direction naturally increases the more, the greater the mandrel area becomes in comparison to the billet area. With an area ratio f/F_0 greater than 40 per cent, a saving of force through the use of rectangular billets can no longer be expected, because the billet first is compressed and then is pierced with axial displacement. With smaller area ratios, it is possible to carry out piercing with the smaller piercing forces which are required for lateral displacement of material; a prerequisite of which is that a sufficiently thick base be left after the termination of piercing.

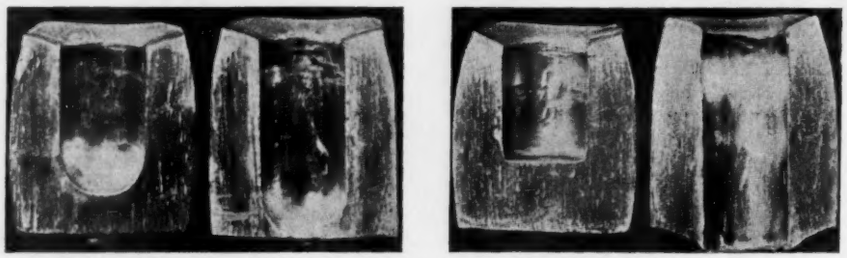

Fig. 105—Sections through lead bodies pierced by the Ehrhardt process

The results of all piercing tests with lead bodies have been summarized in Table IX, in order to permit comparison. Those described were evaluated, in the same manner as was discussed for piercing with axial displacement using flat-faced mandrels; and the deformation resistance and specific mandrel pressure were determined for the various piercing processes. In the tests made by the Ehrhardt process, the total piercing force and the specific mandrel pressure were determined; both for the first piercing section, after the mandrel had traveled 0.78-inch, and for the second piercing section (values in brackets). The table indicates the influence of the various shapes of mandrel and of the different piercing processes upon resulting values.

Resistance Is Larger

In the application of the Ehrhardt process, the deformation resistance in the first pierced section is larger than in piercing with lateral displacement, in spite of the smaller absolute and relative piercing force, if the much smaller deformation is considered. Similarly, an increase of the quantities mentioned is shown by comparison of the Ehrhardt process with that of free piercing. From this fact it follows that the forming of a rectangular billet into a hollow body by the Ehrhardt process is ac-

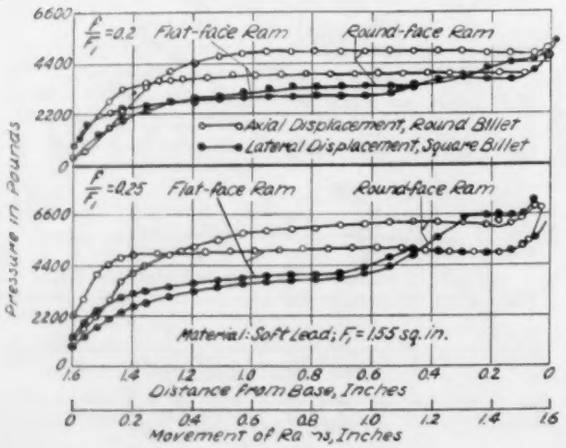

Fig. 104—Comparison between piercing with axial and with lateral displacement

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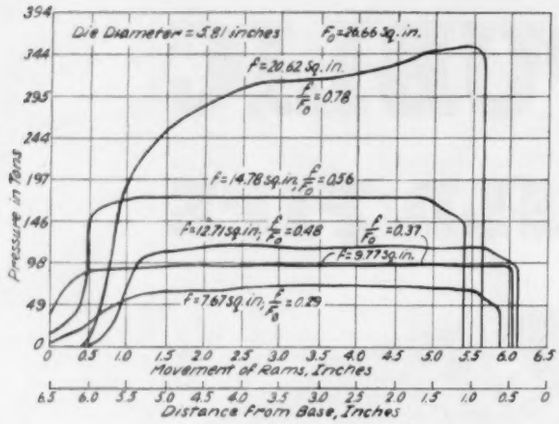
Die Diameter = 5.81 inches
F_0 = 26.66 Sq. in.
F = 20.62 Sq. in.
$\frac{f}{F_0}$ = 0.78
F = 14.78 Sq. in. $\frac{f}{F_0}$ = 0.56
F = 12.71 Sq. in. $\frac{f}{F_0}$ = 0.48
$\frac{f}{F_0}$ = 0.37
F = 9.77 Sq. in.
F = 7.67 Sq. in. $\frac{f}{F_0}$ = 0.29
Pressure in Tons
Movement of Rams, Inches
Distance from Base, Inches

Fig. 106—Variation of force in hot-piercing of steel billets (according to Hofmann)

companied by losses which do not appear in free piercing a round billet.

The derived relations also must be valid for the hot piercing of steel billets. However, the additional influence of cooling naturally is noticeable here, and becomes the greater, the thinner the walls and the smaller the billet, or in other words, the smaller is the ratio of billet volume to the radiating surface. The deformation resistance, moreover, is affected to a large extent by the speed of deformation; which must be chosen the higher, in order to prevent undue cooling, the smaller and thinner the pierced billet is.

Necessitates Series of Tests

The effect of varying wall thickness in hot piercing should be checked here by a series of tests conducted by Hofmann[13], in which steel billets with a strength of about 114,000 pounds per square inch at room temperature were pierced with axial displacement of material. These tests were carried out at temperatures of 2282 to 2300 degrees Fahr., measured in the furnace, in the same die of 5.81 inches diameter, and with various sorts of flat-faced mandrels operated at constant piercing speed. The force-travel diagrams, reproduced in Fig. 106, were determined by deducting the packing friction, measured by the light load of the press, from the forces calculated by means of the hydraulic pressure. An approximately constant piercing force is established here also, immediately after a short movement of the mandrel, as in the small-scale tests conducted on soft lead bodies. The evaluation of the test results is made in Table X, in the same way as previously was described for the small-scale tests (Table IX). In the production of thick-walled hollow blooms with a wall thickness ratio $D_0/(D_1-d)$ of less than 4, the deformation resistance was found in all tests to be about 10,000 pounds per square inch, and the specific mandrel pressure was found to be about 21,300 pounds per square inch. When thin-walled hollow bars were produced, however, the deformation resistance increased to 14,200 pounds per square inch with a wall thickness ratio of about 9, and the specific mandrel pressure increased to more than 35,500 pounds per square inch.

Size Is Important

The importance of the billet size with respect to the resulting deformation resistance and to the specific mandrel pressure in hot piercing can be demonstrated by the piercing tests reproduced in Table XI, which were conducted at the Press-und Walzwerk A.-G., Duesseldorf-Reisholz[14]. In these tests, carried out during ordinary operation, rectangular and octagonal billets of carbon steel of various strength values were pierced with axial displacement in dies of 5.02 to 35.4 inches diameter. The wall thickness ratio $D_0/(D_1-d)$ varied between the limits 2.1 and 3.5; and the temperature, measured in the hollow body after piercing with an incandescent filament pyrometer (uncorrected), varied between 2102 and 2282 degrees Fahr. The speed of piercing amounted to 8.85 feet per minute for the heavy billets, and up to 49.2 feet per minute for the light billets. The highest value

[14] Diplomarbeit S. Oft: Clausthal 1930.

Table X

Hot Piercing Tests with Varying Area Ratio, Using Flat-Faced Mandrels†

1	2	3	4	5	6	7	8	9	10	11	12	13
Distance of mandrel from base inches	Diameter: die D inches	Diameter: mandrel d inches	Area: die F sq. in.	Area: mandrel f sq. in.	Area ratio f/F	Wall Thickness ratio $\frac{D}{D-d}$	Deformation ϕ_{rm} per cent	mandrel force*—P pounds	Specific mandrel pressure p = P/f lbs./sq. in.	Deformation resistance K_f lbs./sq. in.	Temperature** degree F.	Tensile strength lbs./sq. in.	Piercing† velocity in./sec.
4.72	5.805	3.150	26.49	7.796	0.294	2.18	62.9	143,300	18,350	8,530		113,750	6.06
3.94	5.805	3.150	"	"	"	"	"	149,900	19,200	8,960		"	"
3.15	5.805	3.150	"	"	"	"	"	159,900	20,490	9,530		"	"
2.36	5.805	3.150	"	"	"	"	"	159,900	20,490	9,530		"	"
1.57	5.805	3.150	"	"	"	"	"	159,900	20,490	9,530		"	"
4.72	5.805	3.542	26.49	0.860	0.372	2.56	78.0	209,300	21,200	10,100		113,750	6.06
3.94	5.805	3.542	"	"	"	"	"	215,000	21,770	10,380		"	"
3.15	5.805	3.542	"	"	"	"	"	215,000	21,770	10,380		"	"
2.36	5.805	3.542	"	"	"	"	"	215,000	21,770	10,380		"	"
1.57	5.805	3.542	"	"	"	"	"	215,000	21,770	10,380		"	"
4.72	5.805	4.027	26.49	12.74	0.480	3.18	99.7	248,000	19,490	9,390		113,750	6.06
3.94	5.805	4.027	"	"	"	"	"	263,500	20,620	9,950		"	"
3.15	5.805	4.027	"	"	"	"	"	263,500	20,620	9,950	2282	"	"
2.36	5.805	4.027	"	"	"	"	"	264,700	20,770	9,950	to	"	"
1.57	5.805	4.027	"	"	"	"	"	264,700	20,770	9,950	2300	"	"
4.72	5.805	4.685	26.49	14.99	0.566	4.04	123.6	392,500	26,180	11,940		113,750	6.06
3.94	5.805	4.685	"	"	"	"	"	394,800	26,320	12,090		"	"
3.15	5.805	4.685	"	"	"	"	"	394,800	26,320	12,090		"	"
2.36	5.805	4.685	"	"	"	"	"	394,800	26,320	12,090		"	"
1.57	5.805	4.685	"	"	"	"	"	394,800	26,320	12,090		"	"
4.72	5.805	5.157	26.49	20.89	0.787	8.95	203.1	582,200	17,890	10,810		113,750	6.06
3.94	5.805	5.157	"	"	"	"	"	670,500	32,160	12,510		"	"
3.15	5.805	5.157	"	"	"	"	"	700,000	33,420	13,080		"	"
2.36	5.805	5.157	"	"	"	"	"	719,000	34,430	13,360		"	"
1.57	5.805	5.157	"	"	"	"	"	763,000	36,570	14,220		"	"

†According to Hofmann.
*Collar friction is deducted.
**Temperature determined on billet in furnace by pyrometer observation.

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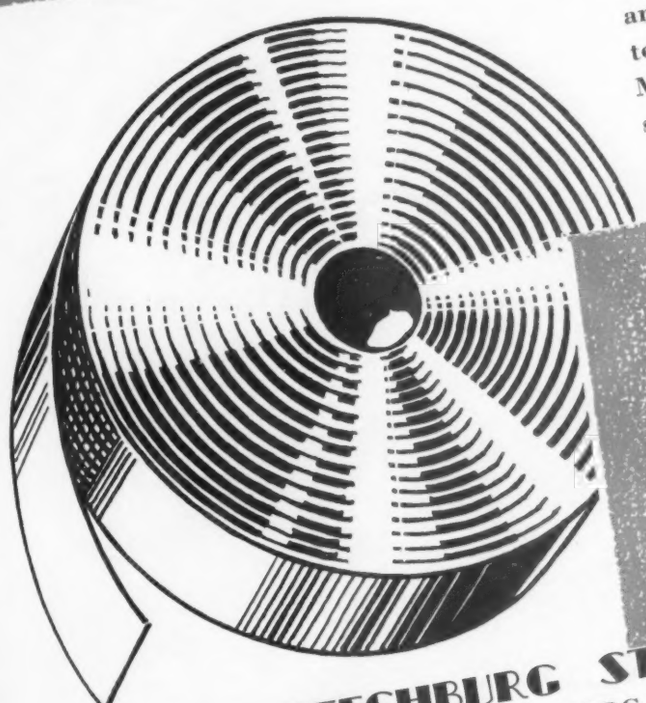

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of the measured mandrel force always is stated in the table. The calculated deformation resistance shows distinctly an increase with diminishing die diameter, and the specific mandrel pressure also changes in a corresponding manner. Although the deformation resistance with the largest billets was only 5700 to 7100 pounds per square inch, it increased to 14,200 to 17,000 pounds per square inch with the smallest billets. The specific mandrel pressure thereby increased from 11,380 to 12,800 to 28,400 to 35,500 pounds per square inch.

Small Influence Observed

The influence of the differing strength of the billets investigated is probably comparatively small, because the deformation resistance of carbon steels of varying hardness is approximately the same at these high temperatures. A more appreciable influence of temperature cannot be observed in these tests. The high temperatures observed after piercing (even in the small billets, although the cooling relations here are intrinsically less favorable than in the heavier billets) are attributed to the fact that the piercing is performed rapidly, so that the supplied energy of deformation can compensate for the transmission of heat to the forming tool.

Under these conditions, the rise of the deformation resistance in the piercing of small billets must be caused primarily by the high speed with which the deformation was performed in these tests. Considering the fact that the forming zone becomes the smaller, the smaller the die and mandrel are, it is evident that the time provided for the deformation of each minute part of the material becomes smaller with diminution of the die diameter, the speed of piercing being constant; so that the velocity of deformation increases correspondingly. By means of each increase in the speed of piercing, a further rise of the deformation velocity is produced. With a die of 5.02 inches diameter and a piercing speed of 49.2 feet per minute, the deformation velocity accordingly amounts to more than 30 times the deformation velocity in the piercing of heavy billets. The large extent to which the velocity of deformation influences the deformation resistance in hot piercing is shown by tests which were carried out with a die of 5.02 inches diameter and with various speeds of piercing. An increase of the piercing speed of about 40 per cent effected here an increase of the deformation resistance from an average value of 14,500 pounds per square inch to 16,600 pounds per square inch, or about 15 per cent. The observed increase of the deformation resistance with diminishing die diameter thus is obvious.

The influences observed here must be considered if the proposed theory of the piercing process and the relations derived therefrom are used for the numerical predetermination of the force requirements for piercing. The test values given in Tables X and XI probably offer valuable indications, in the execution of such calculations in practice, regarding the magnitudes of the specific pressure exerted upon the mandrel and the deformation resistance in the working of steel billets.

In the case of forming by piercing, also, there is no possibility of obtaining any conclusions whatever from the requirement of force regarding the stress distribution in the zone of deformation. In order to obtain a further insight into the stress relations, this case also requires, instead, an experimental determination of the distribution of deformation, from which the directions of the trajectories of principal stress can be calculated.

Particles Are Compressed

Stress condition determined in this way is comparable to an arch construction over the ring-shaped crevice between piercing mandrel and die. The particles of material lying ahead of the mandrel first become effectively compressed in the longitudinal direction; after which, in the annulus, they are stretched both longitudinally and tangentially, a certain amount of torsion also taking place at the same time. High internal forming losses therefore appear inevitably in this type of forming. A detailed representation of the distribution of deformation in piercing is given in Part III, according to tests by E. Siebel and H. Huhne.

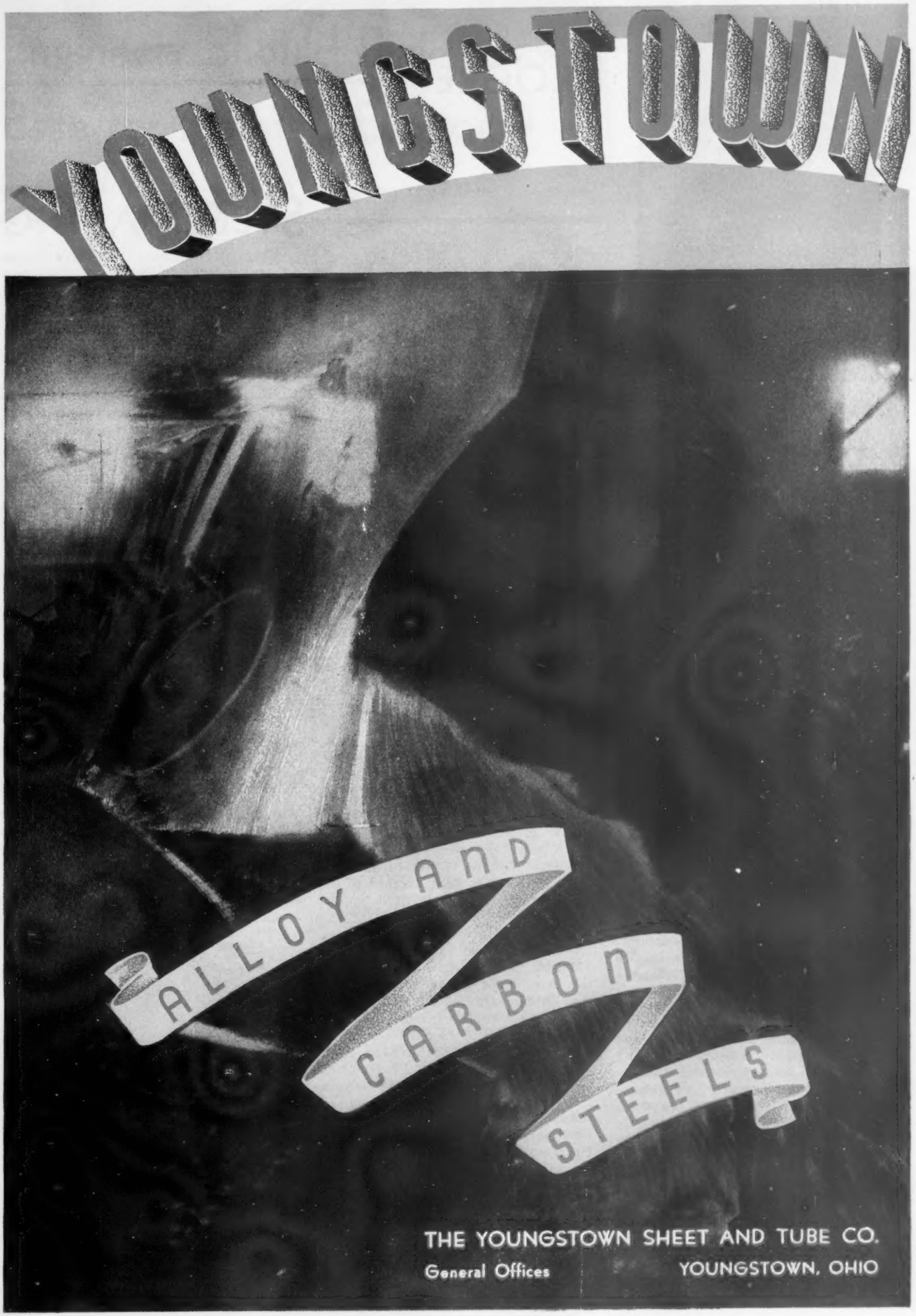
(To be Continued)

Table XI

Hot Piercing Tests with Varying Diameter of Die

1	2	3	4	5	6	7	8	9	10	11	12	13
Diameter		Area										
die D inches	mandrel d inches	die F sq. in.	mandrel f sq. in.	Area ratio, f/F	Wall thickness ratio, D/D-d	Deformation ϕ_{rm} per cent	Mandrel Force-*P pounds	Specific mandrel pressure $p=\frac{P}{f}$ lbs./sq. in.	Deformation resistance, Kf lbs./sq. in.	Temperature** deg. Fahr.	Tensile strength lbs./sq. in.	Piercing velocity in./sec.
35.42	21.65	984.0	367.4	0.374	2.57	78.4	4,150,000	11,240	5,400	2228	57,000-71,000	1.77
35.42	19.68	988.0	303.9	0.308	2.25	65.1	3,999,000	13,230	6,260	2120	57,000-71,000	"
35.42	19.68	988.0	303.9	0.308	2.25	65.1	4,147,000	13,650	6,400	2084	57,000-71,000	"
31.49	19.68	778.0	303.9	0.341	2.67	82.2	3,628,000	11,950	5,690	2120	57,000-71,000	"
31.49	19.68	778.0	303.9	0.391	2.67	82.2	3,705,000	12,230	5,830	2120	85,000-100,000	"
31.49	19.68	778.0	303.9	0.391	2.67	82.2	3,849,000	12,650	5,970	2120	85,000-100,000	"
28.33	16.92	629.0	224.8	0.357	2.48	74.8	3,340,000	14,940	7,110	2120	57,000- 71,000	"
28.33	16.92	629.0	224.8	0.357	2.48	74.8	3,113,000	13,800	6,540	2120	71,000- 85,000	"
28.33	18.10	629.0	257.3	0.409	2.77	85.9	3,556,000	13,800	6,540	2102	57,000- 71,000	"
28.33	18.10	629.0	257.3	0.409	2.77	85.9	3,705,000	14,360	6,830	2120	57,000- 71,000	"
28.33	18.10	629.0	257.3	0.409	2.77	85.9	3,705,000	14,360	6,830	2120	71,000- 85,000	"
23.61	13.97	438.8	153.4	0.350	2.45	73.6	2,399,000	15,640	7,390	2138	57,000- 71,000	"
23.61	13.97	438.8	153.4	0.350	2.45	73.6	2,591,000	16,920	7,970	2120	57,000- 71,000	"
23.61	13.97	438.8	153.4	0.350	2.45	73.6	2,341,000	15,360	7,250	2120	57,000- 71,000	"
23.61	13.97	438.8	153.4	0.350	2.45	73.6	2,814,000	18,340	8,670	2120	71,000- 85,000	"
23.61	13.97	438.8	153.4	0.350	2.45	73.6	2,192,000	14,360	6,830	2129	57,000- 71,000	"
19.68	13.97	303.8	153.4	0.505	3.45	117.9	2,740,000	17,920	7,680	2120	57,000- 71,000	"
17.71	12.00	246.3	113.1	0.460	3.10	97.3	2,440,000	21,610	10,100	2066	57,000- 71,000	"
15.15	8.46	179.7	55.8	0.312	2.27	66.8	1,151,000	20,490	9,530	2174	57,000- 71,000	7.28
15.15	8.46	179.7	55.8	0.312	2.27	66.8	1,179,000	21,050	9,810	2138	57,000- 71,000	7.28
6.97	4.21	38.0	13.95	0.368	2.53	77.0	335,100	24,040	11,510	2282	50,000- 57,000	7.28
6.12	3.66	29.44	10.31	0.350	2.45	73.6	251,300	24,480	11,510	2282	50,000- 57,000	7.28
5.57	2.99	24.32	7.02	0.289	2.16	61.0	201,000	28,600	13,510	2282	50,000- 57,000	9.84
5.02	2.64	19.76	5.46	0.276	2.11	58.6	157,600	28,890	13,650	2282	50,000- 57,000	7.28
5.02	2.64	19.76	5.46	0.276	2.11	58.6	167,500	30,720	14,500	2282	50,000- 57,000	7.28
5.02	2.64	19.76	5.46	0.276	2.11	58.6	177,500	31,160	15,360	2282	50,000- 57,000	7.28
5.02	2.64	19.76	5.46	0.276	2.11	58.6	184,300	33,710	15,930	2282	50,000- 57,000	9.84
5.02	2.64	19.76	5.46	0.276	2.11	58.6	194,400	35,700	16,780	2282	50,000- 57,000	9.84
5.02	2.64	19.76	5.46	0.276	2.11	58.6	201,000	36,850	17,350	2282	50,000- 57,000	9.84

*Neglecting collar friction.
**Temperature measured in the hollow body.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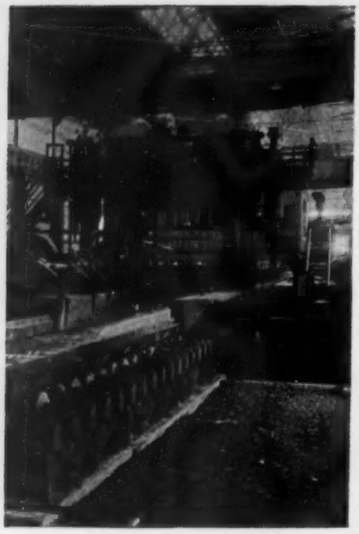


PROGRESS IN STEELMAKING

MAXIMUM operating rates of open-hearth furnaces are being controlled at a plant in this country by temperature. A thermocouple serving each furnace takes the temperature of the insulated surface at the cooler side of the silica roof brick and records it in degrees Fahr. on a recording instrument.

♦ ♦ ♦

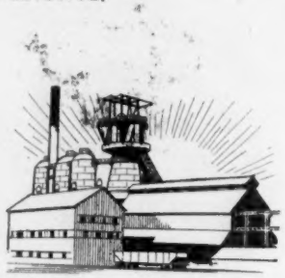
Furnaces initially installed at a sheet mill in the Pittsburgh district for heating packs frequently are used for administering the normalizing treatment.

♦ ♦ ♦

Savings ranging from 50 to 85 per cent have been effected in the time and amount of fuel required to heat up furnaces built with an insulating firebrick lining, according to an authority on insulation.

♦ ♦ ♦

Concentric sections throughout their axial length as well as round steel parts, such as shafts, bearings and balls may now be manufactured by the use of a recently developed roll-forge machine. Round or square stock heated to rolling temperature is reduced and formed as it passes between two rolls and at the same time is rolled in a transverse direction in much the same manner as a pencil is rolled between the palms of the hands. A feature of the machine is that the two rolls are made to oscillate on their axes; as the upper roll moves to the right, the lower roll moves to the left. The oscillating action operates simultaneously with the forward feeding and because of this arrangement, the bar being roll-forged essentially is rolled in two directions at the same time. The product thus becomes concentric and is made to conform to the cross section which is embodied in the roll faces. Reductions from 2 inches to ½-inch and in similar proportion can be accomplished in a single pass. Production of forgings close to size is obtained in unusual quantities per hour. The process produces no flash, the original bar fiber being retained in the parts. The absence of flash, of course, represents considerable saving in material. All forms of concentric shapes can be produced; the rolls are inexpensive, no die sinking being involved.



DRY granulation of blast furnace slag now is accomplished in England by a recently introduced machine which consists essentially of a 3-stepped rotating mill 10 feet in diameter. The unit handles about 20 tons of slag an hour and may be located beneath the slag spout at the furnace or at a remote point in case cinder ladles are used. Three fine water jets are provided at the inlet. The beater arms of the three steps of the mill break the slag into maximum size pieces to afford a large surface contact and cooling effect by the small amount of water used. Any solidified slag, which may be fed into the mill from the cinder pot, is broken by the replaceable beater arms. The granulated product has a low moisture content, averaging about 5 per cent. The specific gravity of the slag invariably is increased thus affording a more homogeneous material. The material also is said to have better physical characteristics.

♦ ♦ ♦

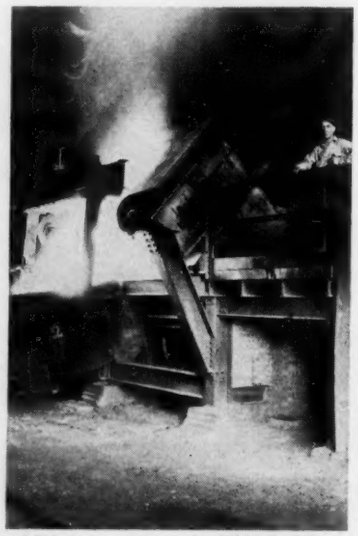
Welding the end of one bundle of wire to another on the galvanizing frame at a plant in Illinois has eliminated splices, reduced difficulty with the wipes and greatly curtailed the quantity of scrap. Great convenience is afforded by this practice because small bundles seldom are left on the take-up when the galvanizer is to be shut down.

♦ ♦ ♦

Drawing and blueing strip steel as it comes from the mill is being accomplished by a stripmaker in a small welded sheet metal lead bath heated by twelve 3-kilowatt heating units at a saving of about $1000 *compared with fuel-fired bath practice.*

♦ ♦ ♦

Curtailing the heating of a lifting magnet and maintaining its lifting power nearer to that of a cold magnet is the purpose of an auxiliary controller used in conjunction with the main magnet controller. The unit includes a spring-closed contactor which is opened by a timing device after the circuit to the magnet has been closed. A resistor in series with the magnet winding is inserted when the contactor is brought to the open position.



ADVERTISING PAGES REMOVED

Engineers Should Build New Base for Planned Economy

TECHNICAL problems relating to iron and steel and allied products came in for important discussion at the 143rd meeting of the American Institute of Mining and Metallurgical Engineers, in New York, Feb. 19-22. Eight sessions were devoted to the iron and steel division, including the Howe memorial lecture, presented by Dr. F. N. Speller, director, department of metallurgy and research, National Tube Co., Pittsburgh, on the subject of the corrosion problem with respect to iron and steel.

Howard N. Eavenson, fuel expert and a member of the consulting engineering firm of Eavenson, Alford & Hicks, Pittsburgh, was elected president (see p. 17), to succeed Dr. Frederick M. Becket, vice president, Union Carbide & Carbon Co., New York. Louis S. Cates, president, Phelps-Dodge Corp., and Karl Eilers, consulting engineer, both of New York, were elected vice presidents of the institute.

Research Efforts Signalized

The Saunders medal was awarded to Pope Yeatman, consulting engineer, New York, for distinguished achievements in mining. Dr. Albert Sauveur, Harvard university, Cambridge, Mass., and Karl Eilers were awarded certificates of honorary membership and Earl W. Palmer and Cyril Stanley Smith, research workers with the American Brass Co., Waterbury, Conn., the Robert Woolston Hunt prize for their paper on "The Precipitation-hardening of Copper Steels." Benjamin J. Harlan, Bethlehem Steel Co., Lackawanna, N. Y., received the J. E. Johnson Jr. award for a study of the use of sintered iron ore in blast furnace practice.

In the annual address of the retiring president, Dr. Becket appealed to the engineering fraternity to work for a planned economy. "Restoration and maintenance of economic security," he said, "is the principle concern of the nation today and the engineer should contribute to the solution by reason of his qualifications to grapple with the problem that harasses wage earners, engineers and employers alike."

Investment in over-expanding facilities, costly selling, profitless competition, wasteful distribution, long-term borrowing for short-lived improvements and mounting taxation to meet increasing cost of government are evils which the engineering profession can combat, Dr. Becket declared.

DR. SPELLER, in reviewing the corrosion problem, said in part: "Reference is made to the early interest of Prof. H. M. Howe on this question when the steel industry was getting under way. The important bearing that an economical solution of this problem has on the future of the industry is discussed in this lecture.

"About 75 per cent of all iron and steel products require protection of some kind if only for the sake of appearance. The many factors involved are classified with respect to the influence of the metal itself or the environment. Various means for protecting iron and steel against corrosion are described with respect to: (1) rendering the environment less active; (2) protecting the metal by resistant coatings: or (3) developing more resistant ferrous alloys. Each type of protection is illustrated by instances from present-day practice."

Accomplishments during the past ten years were reviewed and illustrated by examples. A few of the more important theoretical and practical problems relating to corrosion and its prevention were referred to, and also the question of organization to carry on this work in the most effective manner.

"More scientific study of the fundamentals of the mechanism of corrosion and the dominant factors is needed," said Dr. Speller. "This work should be guided by those best able to advise on what should be done. Corrosion is an ideal problem for study by co-operative investigation."

Reaction of various analyses of alloy steels, including chrome-nickel alloys, subjected to a wide range of heats, action of aluminum during nitride hardening and the determination of oxygen in alloy steels and its effect on tube piercing were subjects included during the Wednesday morning session of the iron and steel division.

WIDE public belief that iron castings first were made in Germany in the Middle Ages is entirely erroneous, according to Dr. Thomas T. Read, Vinton Professor of Mining at Columbia university, New York, speaking on "Ancient Cast Iron." Dr. Read showed lantern slides of many cast iron objects, disinterred from Chinese graves, that were of earlier origin than the second century, A. D.

Many people falsely suppose that cast iron first was used in Europe for making cannon. The first dated cast iron cannon known is Chinese, cast in 1377 A. D.. The Chinese made many large iron castings before that time, among them statues, variously dated from 1000 to 1200 A. D., and a large cast iron bell, dated 1079 A.D.

Low Melting-Point Iron

The largest cast iron statue of which there is any record, Dr. Read said, is a fanciful lion, 18 feet high and 20 feet long. This was cast between 950 and 960 A.D. in atonement for a crime which a rich man had committed. Literary records carry the casting of iron in China as far back as the sixth century B.C. Dr. Read attributed the early development of iron castings in China to phosphorus in the coal in the region where cast iron first was made. This produces an iron that melts at a temperature almost as low as that of bronze, whereas in other countries, where charcoal was used as fuel and the resulting iron contained no phosphorus, its melting temperature would be so high that bronze workers could not melt it.

Dr. Read further suggested the possibility that the iron workers of Shansi, China, made cast iron before they made wrought iron and steel, thus reversing the relation that holds in every other country of the world. Iron weapons were used in other countries long before they were in China. When they first appeared there it was in a different part of the country from where iron first was made, and distant from the phosphorus-bearing coal that made the casting in iron possible. If this can be proved to be true by further archeological excavations it will throw much new light on the beginnings of iron metallurgy.

DISCUSSING basic open hearth bottom-cast practice and iron-oxide control, J. W. Reagan, Edgewater Steel Co., Oakmont, Pa., declared ingots can be produced commercially by the bottom-cast method free from cracks, free from excessive pipe, with yields usually greater than obtained from top-cast ingots. They also can be produced he said, with comparative freedom from troublesome nonmetallic inclusions.

Submitting charts and tables to support his contention, the speaker stated basic open-hearth iron-oxide control permits accurate regulation of the FeO content of the slag, with a resulting decrease in the cost of manufacture, due to greater efficiencies from additions and from higher yields, and finished steel of much better quality.

SCANNING THE FIELD OF TECHNOLOGY

A Digest of Important Developments Pertaining to the Production, Processing, Application and Performance of Steel

Oxygen Effect

By Newell Hamilton, Babcock & Wilcox Tube Co., in a paper presented at the annual meeting of the American Institute of Mining and Metallurgical Engineers in New York, Feb. 19-21*; published in Metals Technology, February,* 12 *pp.,* 3 *ills.,* 3 *tables,* 2 *charts.*

This research was conducted in an effort to determine amounts of oxygen in alloy steels of the 18-8 chrome-nickel and high-chromium types, as well as its effect upon tube piercing. Vacuum fusion method of oxygen analysis was used. Results pointed to the fact that oxygen in these alloy steels, regardless of its combination, is detrimental to the manufacture of tubes, minimum allowable amount being set at 0.01 per cent.

—STEEL, 2-26-34

Vacuum Furnaces

By N. A. Ziegler, Westinghouse Research Laboratories, in Metals & Alloys, January, p. 5, 5 *pp.,* 8 *diags.*

Survey of the mechanism of vacuum melting of steel, with description of various types of furnaces for this work, mostly of laboratory size. Pointing out that the refractory problem in vacuum melting is a difficult one, the author concludes that vacuum melting furnaces today are in a position similar to that in which electric furnaces were 25-30 years ago—just on the edge of ceasing to be laboratory apparatus and of becoming commercial tools.

—STEEL, 2-26-34

Dies

By Charles O. Herb, in Machinery, February, p. 321, 6 *pp.,* 10 *ills.*

Dies required in the manufacture of the modern automobile may weigh as much as 300 tons. How die shops handle these heavy units, how they are laid out, scribed and machined, and other details of die production are set forth. Plaster forms are made for use in machining female die parts. Much hand work is involved in producing the finished dies.

—STEEL, 2-26-34

Steel Beer Kegs

By R. C. Skeel, Truscon Steel Co., in Electrical Production, February, p. 9, 1 *p.,* 1 *sketch.*

These welded steel kegs are sprayed both inside and outside for protective purposes. To avoid bubbles on the inner lacquer coating, special electric blowing equipment had to be set up to exhaust lacquer vapors from the kegs and give the inner coating an air drying before the kegs are taken to the baking oven. One blower is arranged to exhaust 20 kegs.

—STEEL, 2-26-34

Cadmium Spraying

By R. A. Axline, in The Metallizer, January, p. 2, 2 *pp.,* 2 *ills.*

As a means of preventing salt-water corrosion on two tailshafts of a navy cruiser up for repairs, the 21-foot shafts, each 12¾ inches in diameter, were sprayed with 0.032-inch of cadmium by means of metal spraying guns. The shaft was sandblasted before being sprayed, and 165 pounds of cadmium was required for each shaft.

—STEEL, 2-26-34

Welding in Power Plant

By R. H. Rogers, General Electric Co., in a paper presented at a recent joint meeting of New York chapters of the American Society of Mechanical Engineers and American Welding society.

Applications of fusion welding in the boilers, piping and other pressure equipment of the outdoor mercury-steam-electric power plant of the General Electric Co. at Schenectady, N. Y.

—STEEL, 2-26-34

Elastic Properties

By Guy Verse, in a paper presented at the annual December meeting of the American Society of Mechanical Engineers at New York.

This paper deals with the determination of the modulus of elasticity and of the modulus of rigidity of steel at elevated temperatures up to 500 degrees Cent. Static and dynamic methods were used, and the results compared.

—STEEL, 2-26-34

Brittleness

By James J. Curran, Henry Souther Engineering Co., in Metal Progress, February, p. 27, 4 *pp.,* 1 *ill.,* 1 *chart.*

Certain steels, if quenched from just above the Ac_1 critical point, lack both the ductility and hardness they possess after a higher quench. The author suggests this may be a property of all steels, and cites some operating troubles which may be resulting from this characteristic.

—STEEL, 2-26-34

Impact Tests

By H. W. Hiemke and W. C. Schulte, in Metals & Alloys, February, p. 31, 5 *pp.,* 20 *ills.,* 5 *tables,* 39 *bibliographical references.*

A report of impact tests made in the temperature range from 100 to -50 degrees Cent. on plain carbon steel and the low alloy steels of the silicomanganese and chromium-manganese-silicon types in heavy sections.

—STEEL, 2-26-34

Body Welder

By Harold B. Veith, in Machine Design, February, p. 24, 4 *pp.,* 5 *ills.*

Details of design and operation of a large flash welder for assembly of steel automobile bodies. Current capacity is 30,000 amperes. Clamping of parts to be welded is accomplished by sets of air cylinders.

—STEEL, 2-26-34

1934 Autos

By Ernest E. Thum, in Metal Progress, February, p. 15, 7 *pp.,* 4 *ills.*

Survey of metallurgical changes adopted in new automobile designs, including such features as independent springs, carburized and oil quenched gears, the Ford cast crankshaft, brake drum materials, bearings, and the use of stainless steel and chromium plating.

—STEEL, 2-26-34

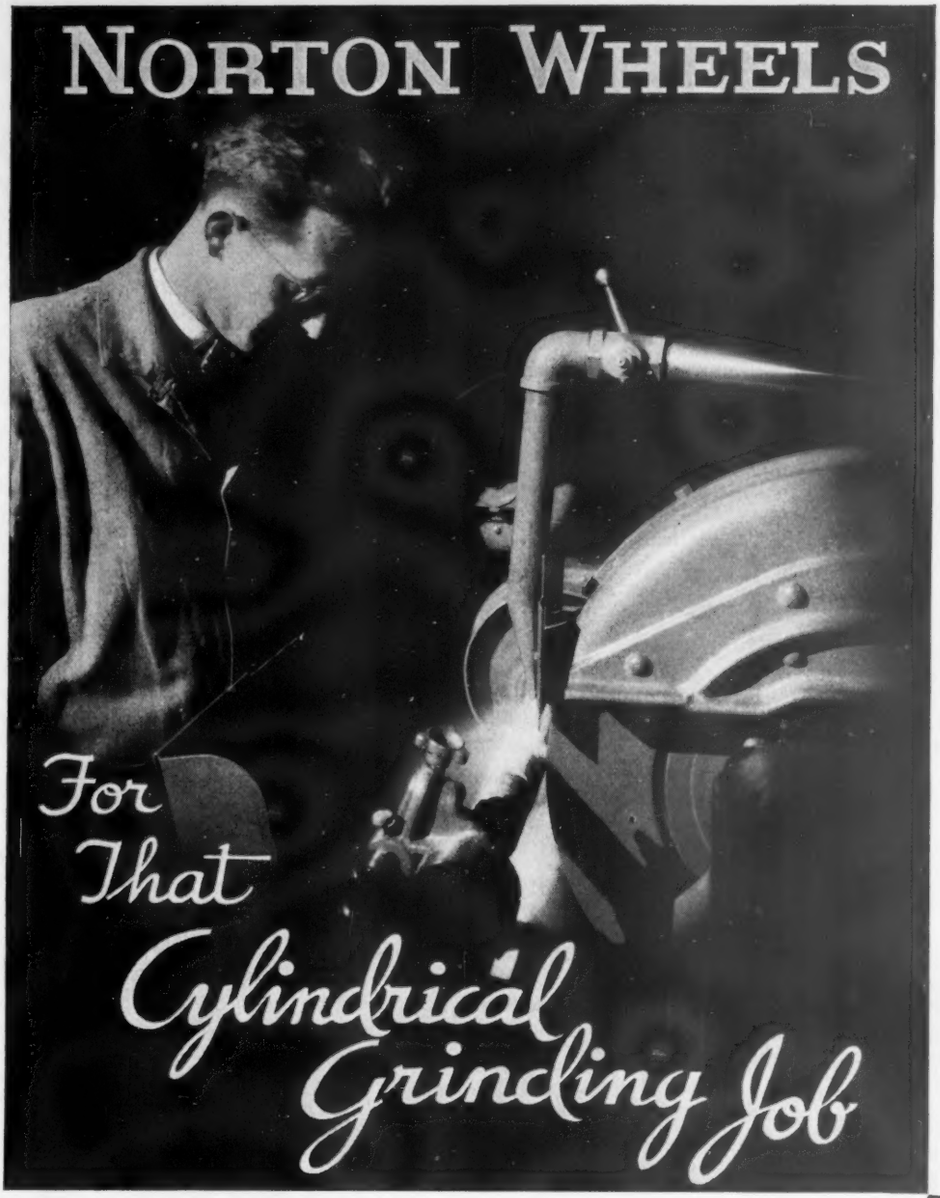
Valve Seats

Machinery, February, p. 343, 2 *pp.,* 3 *ills.*

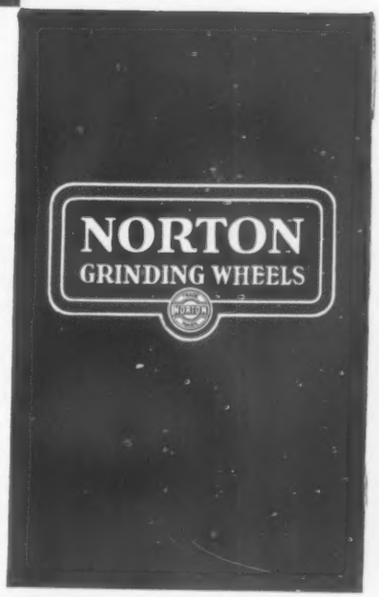
Shrinking-in of heat-resisting valve seat rings in a popular line of passenger car engines is accomplished by use of dry ice refrigerators which cool the rings to 90 degrees Fahr. below zero, thus shrinking them sufficiently to permit them to be hammered into the engine blocks easily.

—STEEL, 2-26-34

NORTON WHEELS



IF your cylindrical grinding jobs are like the majority—are high production, high precision operations—you know that their success depends on very exact fitting of the wheels, they must be right in *every* particular. It's not enough to consider just abrasive and bond, grain and grade. Wheel structure, too, must be right. And with Norton Wheels you can get just the required structure (grain spacing)—for Norton controls the structure by definite, graduated steps. No matter what your cylindrical grinding job may be you can get a Norton Wheel that will do it *right*.



NORTON COMPANY, WORCESTER, MASS.

New York Chicago Detroit Philadelphia Pittsburgh Hartford Cleveland
Hamilton, Ont. London Paris Wesseling, Germany

W-470

NORTON PRODUCTS—Grinding Machines; Lapping Machines • Grinding Wheels; Abrasives for Polishing; India Oilstones, Pulpstones • Laboratory Ware, Refractories; Porous Plates • Non-slip Tiles and Aggregates

NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Tramrail Switches — Cleveland Tramrail division of Cleveland Crane & Engineering Co., Wickliffe, O., is offering a new type D switch suitable for all types of its hand-propelled carriers and for certain types of electrically-operated carriers. The device is more compact and permits closer switch grouping and rail spacing than is possible with the standard sliding type switch. A type E switch also is being introduced. It is built along lines similar to the type D, except that it cannot be electrified.

♦ ♦ ♦

Weight Recorder—Toledo Scale Co., Toledo, O., recently designed a weighing device which automatically and mechanically selects and prints the correct weight figure. It provides basic weight control records upon which accurate industrial accounting structures can be based. An inserted ticket, a continuous strip, or both can be used for the printed record. Control can be located on the scale, at a remote point, or placed to operate automatically in connection with any type of conveyor system.

♦ ♦ ♦

Air Separator—Railway & Industrial Engineering Co., Greensburg, Pa., is offering an automatic separator for removing oil, water and dirt from compressed air lines. The unit is based on the principle that freed water, which condenses as compressed air is cooled, will be precipitated if the air is expanded suddenly. An automatic vent is provided to the atmosphere through a separate chamber to eliminate the precipitated moisture and foreign matter collected by the separator.

♦ ♦ ♦

Indicating Lamp—General Electric Co., Schenectady, N. Y., has developed a new indicating lamp that can be used for signal light indication or, in combination with control switches, to tell whether a circuit breaker is open, closed or tripped automatically. This unit offers the advantages of long lamp life and low wattage consumption, the manufacturer claims. It is intended for application where good visible indication is desired.

♦ ♦ ♦

Horizontal Boring Machine—Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has introduced a new two-spindle horizontal boring, drilling and milling machine. The two-spindle design provides a main spindle of 3½-inch diameter running up to 500 revolutions per minute, and a high-speed auxiliary spindle with a speed range up to 1500 revolutions per minute. A separate milling feed unit for 18 feeds with directional control is built into the spindle head.

♦ ♦ ♦

Capacitor Motors—Louis Allis Co., Milwaukee, has announced a new line of single-phase explosion-proof self-contained capacitor motors. One of the unique features is the capacitor or condenser which is self-contained within the motor. A simple positive-acting switch cuts out the capacitor at a definite predetermined speed. Units are available in non-ventilated and totally-enclosed fan-cooled types.

♦ ♦ ♦

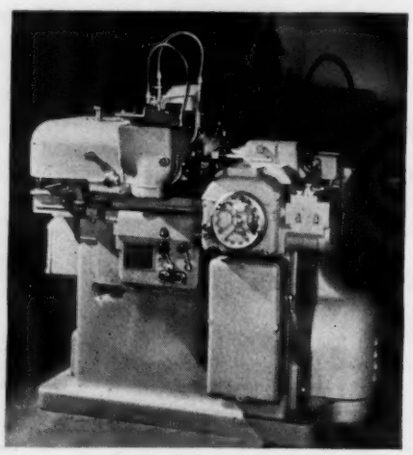
Dragline Bucket—Northwest Engineering Co., 28 East Jackson boulevard, Chicago, recently announced the addition of a new dragline bucket to its line. It is of light weight construction and has a wide mouth, and is built in three sizes, 54, 67½ and 81-cubic foot capacities, struck measure.

♦ ♦ ♦

Circuit Breakers—Square D Co., Switch & Panel division, Detroit, has announced the addition of a 600-ampere frame to its line of industrial circuit breakers. The company now can furnish breakers from 15 to 600 amperes capacity.

♦ ♦ ♦

Internal Centerless Grinder—Heald Machine Co., Worcester, Mass., has brought out a new internal centerless grinder, shown herewith. The machine assures concentricity of the bore with outside diameter of the work-piece within 0.0001 inch. Operation of the machine is automatic, applying the principle of external grinding to centerless internal grinding. The unit is of the chuckless type and controlled hydraulically. Work is fed into the holding section from the loading chute by gravity and rotated between three rolls during the grinding operation. Either straight or tapered holes may be ground. The tool is capable of grinding a wide variety of internal work up to three inches length and three inches diameter. The new principle of chuckless internal grinding is explained on page 24.



♦ ♦ ♦

Globe and Angle Valves—Kennedy Valve Mfg. Co., Elmira, N. Y., is marketing a new line of heavy standard bronze globe and angle valves. A feature is the cadmium plating of the malleable iron union bonnet ring and stuffing box nut. One of the factors which reduces operating friction is the use of four guide prongs on the disk holder which prevents tipping or binding of the disk holder when as the valve is opened or closed.

♦ ♦ ♦

Multispeed Reducer — Davis & Thompson Co., 6619 West Mitchell street, Milwaukee, recently added a new multispeed reducer to its line of motorized reduction units, making possible the use of high constant speed motors. It is built in two, three or more specified speed reductions with a range of from 2.66 to 1 to 1 to 20 to 1 ratio which, coupled with additional speed reduction, provides a range that meets most requirements.

♦ ♦ ♦

Lamp Shock Absorber—Thompson Electric Co., 1101 Power avenue N. E., Cleveland, recently placed on the market a lamp shock absorber or vibration arrester made of malleable iron castings and a heavy spring. The parts are so interlocked that the lamp would not fall even if the spring should ever break. Models and springs for different weights of lamp fixtures are available.

♦ ♦ ♦

Pyrometer—Foxboro Co., Foxboro, Mass., has placed on the market a new recording potentiometer pyrometer which embodies a unique type of balancing mechanism. This device is so designed that it produces a large movement of the pen or print wheel for a small galvanometer deflection. It moves the printing mechanism from one end of the scale to the other in a minimum of time, without requiring an extremely fast cycle or rapid motion of the mechanism. Record dots are square in shape and large enough for the colors to be recognized easily.

Steel Rate Nearing 50% on Strong Market

Lull in New Commitments Anticipated Pending Price Clarification for Second Quarter—Hot Strip Reduction Being Withdrawn—"Ford Specials" Down

THOUGH unsupported by further large commitments from leading consumers last week, steelworks operations continued on an expanding scale, rising 4 points to 47 per cent, highest since last August, and apparently making a rapid approach to 50 per cent.

While steelmakers see an active month ahead in completing shipments for first quarter, a temporary lull in new contracting is anticipated pending final determination of prices and formal opening of books for second quarter.

The tremendous rush of shipments, however, such as ensued last December when users were given the opportunity to cover first quarter needs a month in advance of price increases, evidently will not be duplicated in March. Instead, steelmakers expect a steadier and more consistent upward trend.

Automobile manufacturers have been persistent in efforts to accumulate stocks, but with heavier production ahead, steelmakers look to them to be among the first to place important orders for second quarter, to insure early rolling schedules.

Reaffirmation of prices on semifinished steel, plates, shapes, bars, pipe, wire and some other products is anticipated by some producers, but in sheets and strip the market for second quarter awaits further clarification.

Restoring Hot-Rolled Strip Prices; Ford Planning More Finishing Capacity

In sheets a new classification, heretofore known as Ford special, has been recognized—designated as hot-rolled, pickled in the breakdown annealed deoxidized—with the base price 2.65c, Pittsburgh, a reduction of $2 a ton. Withdrawal of the recent $1 a ton reductions on hot-rolled strip at both Pittsburgh and Chicago is reported, with indications that there will be no change for second quarter.

Following recent efforts of General Motors to acquire the Corrigan, McKinney Steel Co., and its affiliate, Newton Steel Co., Ford is reported preparing plans for increasing semifinished and finishing mill capacity.

With recent assurances from Washington that railroads soon will buy the remaining portion of their total rail requirements, which were estimated at 845,000 tons when makers reduced the price to $36.37½, it is understood this price is to be extended from the expiration date March 1 to April 1. The carriers still have about 500,000 tons to order. New York Central will purchase approximately 8000 tons of rail fastenings with the 40,000 tons of rails on which it opens bids this week. Chesapeake & Ohio has distributed 600 tons of screw spikes.

In sharp contrast with freight car awards in January — officially 152 — is the estimate for February, 19,725, exceeding the total for the past three years. A heavier movement of steel products to equipment builders is in immediate prospect. New York, New Haven & Hartford has ordered 50 streamlined, air-conditioned coaches.

Shape Awards 80 Per Cent Ahead of Last Year; Raw Materials Strong

Structural shape awards for the week, 13,391 tons, were lighter than in the preceding week, but so far this year tonnage is 80 per cent larger than in the comparable period in 1933. The army quartermaster corps is an important customer, its purchasing program, including steel towers, hangars and equipment, running up to $70,000,000. Coltexo Corp., Monroe, La., has placed 2000 tons of spiral welded rust-resisting iron pipe for a 17-mile gas line.

Heavy melting steel scrap has risen 50 cents a ton at Chicago, and at Detroit, Cleveland and Philadelphia the scrap market is up 50 cents to $1. Pig iron shipments continue to increase steadily. Birmingham plants expect to manufacture a substantial portion of a Porto Rican order for 6000 tons of cast pipe. A cargo of 6100 tons of North African manganese ore has arrived at Fairfield, Ala., for the United States Steel Corp.'s subsidiary there.

Steelworks operations last week advanced 6 points to 44 per cent at Chicago; 4½ to 47, Buffalo; 2 to 28, Pittsburgh; 2 to 29½, eastern Pennsylvania; and 9 to 54, Youngstown. They remained unchanged at 79, Detroit; 69, Wheeling; and 52 Birmingham, and were down 3 points to 79 in New England, and 2 points to 77, Cleveland.

STEEL's iron and steel price composite is off 2 cents to $32.40 on an adjustment in basic iron at Pittsburgh; finished steel remains $51.10, while the scrap figure is up 12 cents to $11.95.

COMPOSITE MARKET AVERAGES

	Feb. 24	Feb. 17	One Month Ago Jan., 1934	Three Months Ago Nov., 1933	One Year Ago Feb., 1933	Ten Years Ago Feb., 1924
Iron and Steel Composite	$32.40	$32.42	$32.42	$31.59	$28.31	$43.49
Finished Steel Composite	51.10	51.10	51.10	49.20	45.35	67.48
Steelworks Scrap Composite	11.95	11.83	11.24	9.64	6.33	18.67

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Feb. 24, 1934	Jan. 1934	Nov. 1933	Feb. 1933
Finished Material				
Steel bars, Pittsburgh	1.75	1.75	1.75	1.60
Steel bars, Chicago	1.80	1.80	1.80	1.70
Steel bars, Philadelphia	2.04	2.04	2.04	1.91
Iron bars, Terre Haute, Ind.	1.60	1.60	1.60	1.65
Shapes, Pittsburgh	1.70	1.70	1.70	1.60
Shapes, Philadelphia	1.90	1.90½	1.90½	1.65
Shapes, Chicago	1.75	1.75	1.75	1.70
Tank plates, Pittsburgh	1.70	1.70	1.70	1.60
Tank plates, Philadelphia	1.88	1.88½	1.88½	1.59½
Tank plates, Chicago	1.75	1.75	1.75	1.70
Sheets, No. 10, hot rolled, Pitts.	1.75	1.75	1.75	1.60
Sheets, No. 24, hot ann., Pitts.	2.25	2.25	2.25	2.00
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.85	2.50
Sheets, No. 10, hot rolled, Gary	1.85	1.85	1.85	1.60
Sheets, No. 24, hot anneal., Gary	2.35	2.35	2.35	2.10
Sheets, No. 24, galvan., Gary	2.95	2.95	2.95	2.70
Plain wire, Pittsburgh	2.20	2.20	2.10	2.10
Tin plate, per base box, Pitts.	5.25	5.25	4.65	4.25
Wire nails Pittsburgh	2.35	2.35	2.10	1.85
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	26.00
Wire rods, Pittsburgh	36.00	36.00	35.00	35.00

	Feb. 24, 1934	Jan. 1934	Nov. 1933	Feb. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.26	19.26	19.26	15.76
Basic, valley	17.00	17.00	17.00	14.00
Basic, eastern, del. eastern Pa.	18.76	18.76	17.76	13.50
No. 2 foundry, del. Pittsburgh	18.76	18.76	18.76	15.76
No. 2 foundry, Chicago	17.50	17.50	17.50	15.50
Southern No. 2, Birmingham	13.50	13.50	13.50	11.00
No. 2X, Eastern, del. Phila.	19.63	19.63	18.63	13.76
Malleable, valley	17.50	17.50	17.50	14.50
Malleable, Chicago	17.50	17.50	17.50	15.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.04
Gray forge, del. Pittsburgh	18.38	18.38	18.38	15.63
Ferromanganese, del. Pittsburgh	90.24	90.24	87.24	73.24
Scrap				
Heavy melting steel, Pittsburgh	$14.25	13.05	11.65	8.35
Heavy melting steel, eastern Pa.	11.75	11.62½	9.55	6.50
Heavy melting steel, Chicago	11.25	10.45	8.35	5.25
No. 1 wrought, eastern Pa.	12.75	12.65	10.15	6.50
No. 1 wrought, Chicago	10.65	9.45	8.10	5.00
Rails for rolling, Chicago	12.25	11.25	10.25	7.75
Coke				
Connellsville, furnace, ovens	3.50	3.60	3.75	1.75
Connellsville, foundry, ovens	4.25	4.25	4.25	2.50

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisks denote price changes this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.75c
Gary, base	1.85c
Chicago, del.	1.88c
New York, del.	2.08c
Philadelphia, del.	2.04c
Birmingham, base	1.90c
St. Louis, del.	2.07c
F.o.b. cars, dock Pacific ports	2.42½c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.25c
Gary, base	2.35c
Chicago, del.	2.38c
Detroit, del.	2.45c
New York, del.	2.58c
Philadelphia, del.	2.54c
Birmingham, base	2.40c
St. Louis, del.	2.57c
F.o.b. cars, dock, Pacific ports	2.95c

GALVANIZED No. 24

Pittsburgh, base	2.85c
Gary, base	2.95c
Chicago, del.	2.98c
Philadelphia, del.	3.14c
New York, del.	3.18c
Birmingham, base	3.00c
St. Louis, del.	3.17c
San Francisco, f.o.b. cars, dock	3.55c

TIN MILL BLACK No. 28

Pittsburgh, base	2.65c
Gary, base	2.75c
St. Louis, del.	2.97c

COLD ROLLED No. 10

Pittsburgh, base	2.30c
Detroit, delivered	2.50c
Gary, base	2.40c
Philadelphia, del.	2.59c
New York, del.	2.63c

COLD ROLLED No. 20

Pittsburgh, base	2.75c
Detroit, delivered	2.95c
Gary, base	2.85c
Philadelphia, del.	3.04c
New York, del.	3.08c

ENAMELING SHEETS

Pittsburgh, No. 10	2.45c
Pittsburgh, No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher

Tin plate, coke base contract	$5.25
Do., stock	4.55
Long ternes, No. 24 unassorted	3.25c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets, 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 32.00c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.70c
New York, del	1.98c
Philadelphia, del.	1.88½c
Boston, del.	2.10c
Buffalo, del.	1.93½c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Birmingham, base	1.85c
Coatesville, base	1.80c
Sparrow's Pt., base	1.80c
Pacific Coast, f.o.b. cars, dock	2.25c
St. Louis, del.	1.97c

Structural Shapes

Pittsburgh, base	1.70c
Philadelphia, del.	1.90½c
New York, del.	1.95½c
Boston, del.	2.08½c
Bethlehem, base	1.80c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Buffalo, base	1.80c
Birmingham, base	1.85c
Pacific Coast, f.o.b. cars, dock	2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.75c
Chicago, base	1.80c
Birmingham, base	1.90c
Buffalo, base	1.85c
Cleveland, base	1.80c
Detroit, del.	1.90c
Pacific Coast ports, cars, dock, c.i.f.	2.30c
Philadelphia, del.	2.04c
Boston, del.	2.15c
New York, del.	2.08c
Pitts., forg. qual.	1.75c-2.25c

RAIL STEEL
To Manufacturing Trade

Pittsburgh	1.65c
Chicago	1.70c
Cleveland	1.70c
Gary, Ind.	1.70c
Buffalo	1.75c

IRON

Terre Haute, Ind. base 1.60c
Philadelphia, base.. 1.74c
Pittsburgh, refined.. 2.75c-7.50c

REINFORCING
New billet, cut lengths, carlots

Pittsburgh 1.90c
Chicago, Gary, Buffalo, Cleve., Birm., Young... 1.95c
Gulf ports 2.30c
Pacific coast ports 2.45c
Philadelphia, del. 2.19c

Rail Steel

Pittsburgh, base 1.75c
Chicago, Buffalo, Cleveland, Birm., Young. 1.80c
Gulf ports 2.15c
Pacific coast ports 2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails $2.35
Cement coated nails 2.35
Galvanized nails, 15 gage and coarser 4.35c
Do., 16 gage and finer.. 4.85c

(Per pound)

Polished staples 3.05c
Galvanized fence staples 3.30c
Barbed wire, galv. 2.85c
Annealed fence wire 2.35c
Galvanized fence wire.... 2.70c
Woven wire fencing (base column, c.l.).....$60.00
Plain wire, 6-9 gage to mfg. trade 2.20c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire 3.20c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs..... 2.10c
20,000 to 59,999 lbs..... 2.05c
60,000 to 99,999 lbs..... 2.00c
100,000 lbs. and over.....1.97½c

Chicago, Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Shafting □ □ □

Turned and ground, Pitts. base

1⅛-inch 3.40c
1 3/16 to 1½-inch..... 2.90c
1 3/16 to 1 7/8-inch..... 2.75c
1 15/16 to 2⅞-inch..... 2.60c
2 1/16 to 7-inch..... 2.45c

Alloy Steel Bars □

Hot Rolled

Pittsburgh, Buffalo, Chicago, Massillon, Canton 2.45c
Bethlehem 2.55c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo.....0.50
4600 .20 to .30 Mo. 125-1.75 Ni. 1.05
5100 .80-1.10 Cr.....0.45
5100 Cr. spring.....base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van.....1.50
Carbon van. 0.95
9250.....carbon base plus extras

Strip and Hoops □

†Hot strip to 23⅛-in.
Pittsburgh 1.75c
Do., Chicago 1.80c
Do., del. Detroit.. 1.95c
Do., del. Phila..... 2.04c
Do., del. N. Y..... 2.08c
Cooperage hoop,
Pittsburgh 1.85c
Do., Chicago 1.90c
Cold-rolled strip,
Pitts., Cleve. 2.40c
Worcester 2.60c

Rails, Track Material □

(Gross Ton)

Standard rails, mill $36.37½
Relay rails. Pitts.
20-45 lbs. $26.00
50-60 lbs. $23.00
70-75 lbs. $18.00
80-85 lbs. $25.00
100 lbs. $26.00
Light rails, billet qual., Pitts., Chi. $32.00
Do., reroll. qual.... $31.00
Angle bars, mills... 2.55c
Spikes, R. R. base.. 2.40c
Track bolts, base.... 3.55c
Tie plates, base 1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons or more; diff. for less.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread.....70 off
Rolled thread, ½ x 6 and smaller .....70 off

MACHINE BOLTS

All sizes, cut thread, lag Screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts .....70 off
Tire bolts .....60 off
Stove bolts, 70-25-10 off in pkgs.; 83 off in bulk, 5000 or more of a size.
Rolled thread machine bolts, ½ x 6 and smaller, 70 off
Step bolts .....66 off
Elevator bolts .....66 off

NUTS

Semifinished .....70 off

HEXAGON CAP SCREWS

Milled .....80-10-10 off
Upset 1-in., smaller.....85 off

SQUARE HEAD SET Screws

Upset, 1-in., smaller....75-10 off
Upset, larger than 1-in.... ..... 75-10 off
Headless set screws.....75 off

Rivets, Wrought Washers

Struc., c.l., Pittsburgh, Cleveland 2.75c
Struc., c.l., Chicago 2.85c
⅞-in. and smaller, Pitts., Chi., Cleve..70 and 10 off
Wrought washers, Pitts., Chi., Phila..6.00-6.25 off

Cut Nails, Piling □

Cut nails, Pitts:; (10% discount on size extras) $2.75
Do. less carloads, 5 kegs or more; no discount on size extras $3.00
Do., less than 5 kegs; no discount on size extras $3.15
Steel piling, Pittsburgh.... 2.00c
Steel piling, Chi., Buff..... 2.10c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD
Steel

In.	Blk.	Gal.
¼ and ⅜	57	38½
½	62	50½
¾	65½	55½
1—3	67½	58½

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD
Steel

2	63½	54½
2½—3	66½	57½
3½—6	68½	59½
7 and 8	67½	57½
9 and 10	67	57

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE
Steel

⅛-inch, butt weld..... 50½
¼—⅜, butt weld..... 56
½, butt weld 61
¾, butt weld 64½
1—3, butt weld 66½
2-inch, lap weld 62½
2½—3, lap weld 65½
3½—6, lap weld..... 67½
7—8, lap weld 66½

Iron

⅛—1½-inch, black and galv. take 4 pts. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3¾	50	3	17
4	52	3¾—3½	18
4½—6	42	4	20
1½	1	4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% discounts on steel and 10% on charcoal iron.

Lapwelded steel: Under 10,000 lbs., 6 pts. under base and one 5%; on 10,000 lbs. to carload, 4 pts. under base and two 5%. Quantity discounts same as for hot-rolled. Charcoal iron; Under 10,000 lbs., 2 pts. under base; on 10,000 lbs. to carload, base and one 5%.

SEAMLESS BOILER TUBES

Cold Drawn			
2—2¼	27	3¼—3½	41
2½—2¾	34	4	46
3	38	4½, 5, 6	43

(On 1—1¾-inch sizes mechanical tubing dis. apply.)

Hot Rolled			
2—2¼	33	3¼—3½	47
2½—2¾	40	4	49
3	44	4½, 5, 6	42

Quantity discounts: Under 10,000 lbs., 10 pts. and 5%; 10,000 to 24,999 lbs., 6 pts. and 5%; 25,000 lbs. to carload, 2 pts. and 5 and 5%; carload and over, base discount and 5 and 5%. No extra for lengths 24 ft. and under.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs..... 32%
15,000 ft. or 22,500 lbs..... 70%

Cast Iron Water Pipe □

Class B Pipe—Pet Net Ton

6-in., & over, Birm...$36.00-37.00
4-in., Birm. 39.00-40.00
4-in., Chicago 47.00-48.00
6 to 24-in., Chicago 44.00-45.00
6-in., & over, east. fdy. 40.00
Do., 4-in. 43.00

Class A pipe $3 over Class B. Stnd. fitgs., Birm. base....$90.00

Six to 24-inch, fittings base; over 24-inch plus $20; 4-inch. plus $10; 3-inch, plus $20; gas pipe fittings, 5 higher.

Semifinished Steel □

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pitts., Chi., Cleve., open-hth. & bess. $26.00
Philadelphia 31.30
Forgings, Pitts., Chi. 31.00

SHEET BARS

Pitts.,Cleve., Young. 26.00
Chicago 26.00
Canton, O. 26.00

SLABS

Pitts.,Cleve., Young. 26.00

WIRE RODS

Pitts., Cleveland..... 36.00
Chicago 37.00

SKELP

All grades, Pitts., and Chicago 1.60c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville fur. $3.50
Connellsville fdry.... 4.25
Connel. prem. fdry. 5.00- 5.25
New River fdry..... 6.00
Wise county fdry... 4.25- 5.00
Wise county fur..... 3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del. 8.71- 9.31
Chi., ov., outside del. 8.50
Chicago, del 9.25
New England, del... 10.50
St. Louis, del. 9.25
Birmingham, ovens 5.00
Indianapolis, del..... 8.75
Ashland, Ky., Connellsville basis..... 6.00
Portsmouth, ovens, Connellsville basis 6.00
Buffalo, ovens 7.50- 8.00
Detroit, ovens 8.00
Philadelphia, del..... 9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots	Spot
Pure benzol	$0.205
90 per cent benzol..	$0.205
Toluol	0.30
Solvent naphtha.....	0.26
Commercial xylol....	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums).. 0.163c
Do. (100 lb.) 0.178c

Per lb., producers' plants

Naphthalene flakes and balls 6.00- 7.25

Per 100 lb. Atlantic seaboard

Sulphate of ammonia $1.25

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25. Gross tons.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$18.50	$19.00	$18.00	$19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	.....	18.00	.....
From Swedeland, Pa., del. to Philadelphia	19.26	19.76	18.76	.....
From Bethlehem, del. to Brooklyn	20.77	21.27	.....	.....
From Bethlehem, del. to Newark, N. J.	19.99	20.39	.....	.....
Basing Point:				
Everett, Mass.	18.50	19.00	18.00	19.50
From Everett, del. to Boston	19.00	19.50	18.50	20.00
Basing Point:				
Buffalo	17.50	18.00	16.50	18.50
From Buffalo, del. to Boston	19.00	19.50	18.50	20.00
Basing Points:				
*Neville Island, Pa.	18.00	18.00	17.00	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown, O.	17.50	17.50	17.00	18.00
From Neville Island, Pa., del. to Pittsburgh district	(Neville Island base, plus 63c to $1.13 switching charges)			
Basing Points:				
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, O.	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
From Detroit, del. to Saginaw, Mich.	19.60	19.60	19.10	20.10
From Cleveland, del. to Akron, Canton, O.	18.76	18.76	18.26	19.26
From Toledo, del. to Mansfield, O.	19.26	19.26	18.76	19.76
Basing Point:				
Jackson, O.	19.25	19.25	18.75	.....
Hamilton, O.	17.50	17.50	17.00	18.00
From Hamilton, del. to Cincinnati	18.51	18.51	18.01	19.01
Do., del. to Indianapolis	19.77	19.77	19.27	20.27
Basing Points:				
Duluth	18.00	18.00	.....	18.50
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	.....
From Duluth, del. to St. Paul	19.94	19.94	.....	20.44
From Chicago, del. to Milwaukee	18.50	18.50	18.00	19.00
From Chicago, Toledo or Detroit, del. to Muskegon, Mich.	20.40	20.40	19.90	20.90
From Granite City, del. to St. Louis	18.00	18.50	17.50	.....
Basing Point:				
†Birmingham, Ala.	13.50	.....	12.50	.....
From Birmingham, del. to:				
Boston	18.62	.....	18.12	.....
Newark, N. J.	19.58	.....	.....	.....
Brooklyn, N. Y.	20.39	.....	.....	.....
Baltimore	19.02	.....	18.52	.....
Philadelphia	18.88	.....	18.38	.....
Cleveland	17.62	.....	17.50	.....
Cincinnati	18.13	.....	17.51	.....
Chicago	*17.72	.....	17.60	.....
St. Louis	17.62	.....	17.50	.....

†Southern delivery only. Prices at northern points are adjusted to quotations on northern iron. *Over 0.70 phos.

Basing Point:
Provo, Utah ..... 16.50 ....

LOW PHOS.

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.00. Basing point: Johnson City, Tenn.—$23.00
Philadelphia, standard and copper bearing..... 24.13

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	Lake Superior fur.	20.50
Pitts. dist. fur.	17.75	Do., del. Chicago	23.54

SILVERY

Jackson county, O., base; 6%—$22.25; 7—$23.25; 8—$24.25; 9—$25.25; 10—$26.25; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base; 10%—$27.25; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Iron Ore

LAKE SUPERIOR ORE
Gross ton, 51½% Lower Lake Ports

Old range bess.	$4.30
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES
Cents, unit, del. E. Pa.

Foundry and basic, 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-65% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$14.00-14.25
N. F. fdy., 55%	7.00
Chrome ore 48% gross ton, c.i.f.	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	24.00
So. African, 52%	24.00
So. Afr., 49-51%	22.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK
First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ohio, Ill., Ky., Md., Mo., Ga., Ala.	40.00
MALLEABLE BUNG BRICK all bases	50.00
SILICA BRICK	
Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00
MAGNESITE	
Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00

BASIC BRICK
Net ton, f.o.b. Baltimore, Plymouth, Meeting, Pa., Chester, Pa.

Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar 85-5

Washed gravel, duty paid, tide, gross ton	$21.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$14.75-15.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
del. Pittsburgh	90.24
Spiegeleisen, 19-20%, dom., fur., spot†	26.00
Ferrosilicon, 50%, freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent. Spot, $5 a ton higher.	126-130.00
Silicomang., 2½ carb	90.00
2% carbon	95.00
1% carbon	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont.	1.16- 1.25
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 8.25c Conn. copper

Sheets	
Yellow brass (high)	13.75
Copper, hot rolled	15.00
Lead, cut, to jobbers	7.75
Zinc, 100-lb. base	9.00
Tubes and Pipes	
High yellow brass	16.25
Seamless copper	16.25
Rods	
High yellow brass	12.25
Copper, hot rolled	12.25
Anodes	
Copper, untrimmed	12.75
Wire	
Yellow brass (high)	14.25

Old Metals

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.50- 4.75
Chicago	4.37½-4.87½
Cleveland	5.00- 5.25
St. Louis	4.75- 5.00
Heavy Copper and Wire	
New York	6.12½- 6.25
Chicago, No. 1	5.75- 6.00
Cleveland	5.50- 5.75
St. Louis	5.75- 6.00
Composition Brass Borings	
New York	4.25- 4.50
Light Copper	
New York	5.25- 5.50
Chicago	4.50- 4.75
Cleveland	5.00- 5.25
St. Louis	4.75- 5.00
Light Brass	
Chicago	2.50- 2.75
Cleveland	3.00- 3.25
Lead	
New York	3.00- 3.25
Cleveland	2.75- 3.10
Chicago	2.75- 3.00
St. Louis	3.10- 3.25
Zinc	
New York	2.25- 2.50
Cleveland	2.25
Chicago	2.25- 2.50
St. Louis	2.50- 2.75
Aluminum	
Clips, soft. Cleve.	13.50-14.00
Borings, Cleveland	6.00- 7.00
*Mixed, cast Cleve.	10.75-11.25
Mixed, cast St. L.	10.50-11.00

Secondary Metals

*Brass ingot, 85-5-5-5	8.00
*Remelt al. No. 12	15.50-16.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dealers	7.75- 8.00
Buffalo, No. 1	11.75-12.25
Buffalo, No. 2	10.25-10.75
Chicago	11.00-11.50
Cleveland, No. 1	11.50-12.00
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.00- 9.50
Eastern Pa.	11.50-12.00
Eastern Pa., No. 2	9.50-10.00
Federal, Ill.	8.75- 9.25
Granite City, Ill.	9.25- 9.75
N. Y., deal. R. R.	9.00
N. Y., deal. No. 2	7.50
Pittsburgh, No. 1	14.00-14.50
St. Louis, No. 1 del.	10.50-11.00
Valleys, No. 1	13.50-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.25-10.75
Chicago, factory	9.50-10.00
Cleveland	11.00-11.50
Detroit	10.00-10.50
E. Pa., new mat.	10.50
Pittsburgh	14.00-14.50
Valleys	13.00-13.50

BUNDLED SHEETS

Buffalo	6.50- 7.00
Cincinnati, del.	5.75- 6.25
Cleveland	8.50- 9.00
Pittsburgh	12.50-13.00
St. Louis	5.75- 6.25

SHEET CLIPPINGS LOOSE

Chicago	5.50- 6.00
Cincinnati	5.00- 5.50
Detroit	7.00- 7.50
St. Louis	4.50- 5.00

STEEL RAILS, SHORT

Birmingham	10.50-11.00
Boston, dealers	7.50- 7.75
Buffalo	12.50-13.00
Chicago (3 ft.)	12.00-12.50
Chicago (2 ft.)	13.00-13.50
Cincinnati, del.	11.00-11.50
Detroit	11.00-11.50
Pitts., (open-hearth 3 ft. and less	15.50-16.00
St. Louis	12.50-13.00

STOVE PLATE

Birmingham	6.50- 7.50
Boston, dealers	4.75- 5.00
Buffalo	9.50-10.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	6.00- 6.50
Detroit, net	6.00- 7.00
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry.	6.00
St. Louis	6.50- 7.00

COUPLERS, SPRINGS

Buffalo	12.00-12.50
Chicago, springs	12.50-13.00
Eastern Pa.	14.00-15.00
Pittsburgh	15.50-16.00
St. Louis	11.50-12.00

ANGLE BARS—STEEL

Chicago	11.75-12.25
St. Louis	10.00-10.50

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.00-12.50
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa. crops	14.00-14.50
Pittsburgh, billet, bloom crops	16.50-17.00
Pittsburgh, sheet bar crops	15.50-16.00

FROGS, SWITCHES

Chicago	10.50-11.00
St. Louis	10.00-10.50

SHOVELING STEEL

Chicago	11.00-11.50
St. Louis	8.25- 8.75

RAILROAD WROUGHT

Birmingham	7.00- 8.00
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.00- 9.50
Buffalo, No. 2	11.75-12.25
Chicago, No. 1, net	9.25- 9.75
Chicago, No. 2	11.00-11.50
Cincinnati, No. 2	8.50- 9.00
Eastern Pa.	12.50-13.00
N. Y., No. 1 deal	8.00- 8.50
St. Louis, No. 1	7.00- 7.50
St. Louis, No. 2	8.75- 9.25

SPECIFICATION PIPE

Boston	4.50- 4.75
Eastern Pa.	10.00
New York, dealers	5.25- 5.50

BUSHELING

Buffalo, No. 1	10.25-10.75
Chicago, No. 1	9.25- 9.50
Cinci., No. 1 deal	6.00- 6.50
Cincinnati, No. 2	2.50- 3.00
Cleveland, No. 2	9.00- 9.50
Detroit, No. 1 new	8.50- 9.00
St. Louis, No. 1	6.50- 7.00
Valleys, new No. 1	13.00-13.50

MACHINE TURNINGS

Bimingham	4.50- 5.00
Boston, dealers	4.00- 4.25
Buffalo	7.00- 7.50
Chicago	6.50- 7.00
Cincinnati, dealers	4.75- 5.25
Cleveland	8.75- 9.25
Detroit	6.75- 7.25
Eastern Pa.	7.00- 7.50
New York, dealers	3.25- 3.50
Pittsburgh	10.75-11.25
St. Louis	5.25- 5.75
Valleys	10.25-10.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	1.75- 2.00
Buffalo	7.50- 8.00
Cincinnati, dealers	4.75- 5.25
Cleveland	9.00- 9.50
Detroit	7.50- 8.00
Eastern Pa.	6.00- 6.50
New York, dealers	2.00- 2.50
Pittsburgh	8.25- 8.75

CAST IRON BORINGS

Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	7.50- 8.00
Chicago	7.00- 7.50
Cincinnati, dealers	4.75- 5.25
Cleveland	9.00- 9.25
Detroit	7.50- 8.00
E. Pa., chemical	12.00-15.00
New York, dealers	3.00- 3.50
Pittsburgh	8.50- 9.00
St. Louis	5.25- 5.75

PIPE AND FLUES

Cincinnati, dealers	4.00- 4.50

RAILROAD GRATE BARS

Buffalo	6.25- 6.75
Chicago, net	7.00- 7.50
Cincinnati	5.25- 5.75
Eastern Pa.	8.50- 9.00
New York, dealers	5.00- 5.50
St. Louis	5.50- 6.00

FORGE FLASHINGS

Boston, dealers	5.00- 5.25
Buffalo	9.50-10.00
Cleve., over 10 in.	9.25- 9.75
Detroit	7.75- 8.25

FORGE SCRAP

Boston, dealers	4.25- 4.50
Chicago, heavy	11.50-12.00
Eastern Pa.	10.50-11.00

ARCH BARS, TRANSOMS

St. Louis	9.75-10.25

AXLE TURNINGS

Boston, dealers	4.50- 5.00
Buffalo	7.50- 8.00
Chicago, elec. fur.	9.50-10.00
Cleveland	10.00-10.50
Eastern Pa.	11.00
St. Louis	6.00- 6.50

STEEL CAR AXLES

Birmingham	10.00-11.00
Boston, ship. point.	8.00- 8.50
Buffalo	11.00-11.50
Chicago, net	12.00-12.50
Eastern Pa.	14.00
St. Louis	11.50-12.00

SHAFTING

Boston, ship. point.	10.75-11.00
Eastern Pa.	16.25-16.50
New York, dealers	11.50-12.00
St. Louis	9.00- 9.50

CAR WHEELS

Birmingham, iron	8.75- 9.25
Boston, iron deal.	6.00- 6.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.00-12.50
Chicago, iron	11.50-12.00
Chicago, rolled steel	12.00-12.50
Cincinnati, iron	8.25- 8.75
Eastern Pa., iron	13.00
Eastern Pa., steel	14.00-15.00
Pittsburgh, iron	11.50-12.00
Pittsburgh, steel	15.50-16.00
St. Louis, iron	9.00- 9.50
St. Louis, steel	11.50-12.00

NO. 1 CAST SCRAP

Birmingham	8.50- 9.00
Boston, No. 2	6.00- 6.25
Boston, tex. con.	10.50-11.00
Buffalo, cupola	11.00-11.50
Buffalo, mach.	12.00-12.50
Chicago, agri. net	8.50- 9.00
Chicago, mach. net	9.00-10.00
Chi., railroad net	9.00- 9.50
Cinci., mach. cup	9.00- 9.50
Cleveland, cupola	11.50-12.00
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.00-13.00
Pittsburgh, cupola	12.75-13.25
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.75- 9.25
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST

Boston, del.	6.50- 6.75
Buffalo, break.	8.50- 9.00
Cleveland, break.	8.50- 9.00
Detroit, break.	8.50- 9.00
Detroit, auto net	11.00-11.50
Eastern Pa.	11.50-12.00
N. Y., No. 1, deal	8.00- 8.50
N. Y., break. deal	7.25- 7.75
Pittsburgh	11.75-12.25

MALLEABLE

Boston, consum.	12.00-12.25
Buffalo	12.00-12.50
Chicago, R. R.	11.75-12.25
Cinci., agri. del.	8.00- 8.50
Cinci., R. R. del.	8.50- 9.00
Cleveland, rail.	11.50-12.00
Detroit, auto	9.50-10.00
St. Louis, R. R.	9.00- 9.50
Eastern Pa., R. R.	11.50-12.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.75-11.50
Boston, dealers	7.75- 8.00
Buffalo	10.50-11.50
Chicago	12.00-12.50
Eastern Pa.	13.00
New York, dealer	7.50- 8.00
St. Louis	12.00-12.50

LOCOMOTIVE TIRES

Chicago (cut)	11.50-12.00
St. Louis, No. 1	9.00- 9.50

LOW PHOS. PUNCHINGS

Buffalo	11.50-12.00
Chicago	12.50-13.00
Eastern Pa.	14.50
Pittsburgh	15.50-16.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin New York: Spot	Straits Tin New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
Feb. 17	8.00	8.12½	7.25	52.15	52.30	4.00	3.90	4.40	*22.90	7.15	35.00
Feb. 19	8.00	8.12½	7.75	52.55	52.70	4.00	3.90	4.40	*22.90	7.15	35.00
Feb. 20	8.00	8.12½	7.75	51.85	51.97½	4.00	3.90	4.40	*22.90	7.25	35.00
Feb. 21	8.00	8.12½	7.75	52.40	52.50	4.00	3.90	4.40	*22.90	7.25	35.00
Feb. 22—Holiday											
Feb. 23	8.00	8.12½	7.75	52.35	52.45	4.00	3.90	4.40	*22.90	7.20	35.00

*Nominal quotation. Market range 19.00c to 22.90c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	□
Baltimore*	2.75c
Boston††	2.90c
Buffalo	2.95c
Chattanooga	3.26c
Chicago	2.90c
Cincinnati	3.10c
Cleveland	2.90c
Detroit	2.98½c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.00c
New York‡(d)	3.17c
Pittsburgh	2.85c
Philadelphia*	2.75c
San Francisco	3.55c
Seattle	3.40c
St. Louis	3.14c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	□
Portland	3.40c
San Francisco	3.55c
Baltimore*	2.60c
Chattanooga	3.26c
Chicago	2.75c
Cincinnati	3.10c
Detroit	2.98½c
New York‡(d)	3.10c
Philadelphia*	2.75c
St. Louis	3.14c
Tulsa	3.25c

REINFORC. BARS	□
Boston	2.75c-3.25c
Buffalo	1.95c
Chattanooga	3.26c
Chicago	1.95c-2.10c
Cleveland (c)	1.97½c
Cincinnati	3.10c
Houston	3.25c
Los Ang., cl.	3.10c
New Orleans	3.00c
New York	3.17c
Philadelphia	2.62½c
Pitts., plain	3.00c
Pitts., twisted squares	3.12½c
Seattle	3.50c
St. Louis	3.29c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES	□
Baltimore*	2.75c
Boston††	3.07c
Buffalo	3.20c
Chattanooga	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland	3.21c
Detroit	3.30c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.50c
New York(d)	3.27c
Philadelphia*	2.75c
Pittsburgh	3.05c
Portland	3.40c
San Francisco	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

PLATES	□
Baltimore*	2.75c
Boston††	3.08c
Buffalo	3.20c
Chattanooga	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland, ¼-in. and thicker	3.21c
Cleve., 5/16-in.	3.20c
Detroit	3.30c
Detroit, 3/8-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.50c
New York(d)	3.30c
Philadelphia*	2.75c
Phila. floor	4.35c
Pittsburgh	3.05c
Portland	3.40c
San Francisco	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	□
Baltimore*	2.95c
Boston††	2.90c
Buffalo	3.10c
Chattanooga	3.26c
Chicago	2.95c
Cincinnati	3.10c
Cleveland	3.01c
Det., 8-10 ga.	3.03½c
Houston	3.35c
Los Angeles	3.65c
New Orleans	3.50c
New York	3.17c
Portland	3.65c
Philadelphia*	2.95c
Pittsburgh	2.85c
San Francisco	3.75c
Seattle	3.65c
St. Louis	3.19c-3.36c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	□
Baltimore*†	3.50c
Boston (g)	3.75c
Buffalo	3.25c
Chattanooga	4.01c
Chicago	3.70c
Cincinnati	3.85c
Cleveland	3.76c
Detroit	3.78½c
Los Angeles	4.15c
New York	3.65c
Philadelphia*†	3.40c
Pittsburgh**	3.40c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.94c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	□
Baltimore*†	3.75c
Buffalo	4.00c
Boston (g)	4.35c
Chattanooga	4.61c
Chicago	4.20c-4.30c
Cincinnati	4.45c
Cleveland	4.36c
Detroit	4.45c
Houston	4.40c
Los Angeles	4.75c
New Orleans	4.35c
New York	4.25c
Pitts.**	3.90c-4.20c
Portland	4.85c
San Francisco	4.85c
Seattle	4.85c
St. Louis	4.54c
St. Paul	4.19c
Tulsa	5.10c
Philadelphia*†	4.00c

BANDS	□
Baltimore	3.05c
Boston††	3.15c
Buffalo	3.30c
Chattanooga	3.51c
Chicago	3.20c
Cincinnati	3.35c
Cleveland	3.26c
Detroit, 7/8-in. and lighter	3.28½c
Houston	3.25c
Los Angeles	3.80c
New Orleans	3.20c
New York(d)	3.42c
Philadelphia	3.05c
Pittsburgh	3.10c
Portland	3.90c
San Francisco	3.15c
Seattle	3.90c
St. Paul	3.20c
Tulsa	3.45c
St. Louis	3.44c

HOOPS	□
Baltimore	2.80c
Boston	4.15c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.35c
Det., No. 14 and lighter	3.28½c
New York	3.42c
Philadelphia	3.30c
Pittsburgh	3.60c
Seattle	5.40c
St. Paul	3.75c

COLD FIN. STEEL	□
Baltimore (c)	3.71c
Boston	4.00c-4.50c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland (h)	3.50c
Detroit	3.63½c
Los Ang. (f)	5.95c
New Orleans	4.25c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran. (f)	5.95c
Seattle (f)	4.75c
St. Paul	3.20c
St. Louis	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	□
Boston, 0.100-in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleveland (b)	5.55c
Detroit	5.40c
Philadelphia	4.00c
New York	4.55c
St. Louis	5.74c

(b) Net base, straightening, cutting, boxing, 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) 50 bundles or over.
(h) Outside delivery, 10c less.

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.
†New extras apply.
††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Feb. 21

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

PIG IRON	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	
Foundry, 2.50-3.00 Silicon.	$14.86	2 18 6	$8.52	1 15 0
Basic bessemer	13.72	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05	16.64	3 5 6	....	.....
SEMIFINISHED STEEL				
Billets	$27.94	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage	39.62	7 16 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$39.37	7 15 0	$26.77	5 10 0
Merchant bars	1.65c	7 5 0	.72c	3 5 0
Structural shapes	1.67c	7 7 6	.63c	2 17 6
Plates, †¼ in. or 5 mm.	1.82c	8 0 0	.91c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.10c	9 5 0	1.27c	5 15 0
Sheets, gal., 24 gage, corr.	2.55c	11 5 0	1.54c	7 0 0
Bands and strips	1.82c	8 0 0	.85c	3 17 6
Plain wire, base	2.21c	9 15 0	1.18c	5 7 6
Galvanized wire, base	2.61c	11 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.72c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$ 4.19	0 16 6	....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d 4($3.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$15.88	3 2 6(a)†	$13.10	200	$14.12	305	$24.92	63
Basic bessemer pig iron	16.51	3 5 0(a)*	12.12	185	13.43	290	27.49 (b)	69.50
Furnace coke	4.57	0 18 0	7.86	120	5.09	110	7.61	19.25
Billets	27.94	5 10 0	26.53	405	20.37	440	38.17	96.50
Standard rails	1.87c	8 5 0	2.10c	700	2.31c	1,100	2.36c	132
Merchant bars	1.73c	7 12 6	1.68c	560	1.16c	550	1.97c	110
Structural shapes	1.99c	8 15 0	1.65c	550	1.16c	550	1.93c	107.50
Plates, †¼-in. or 5 mm.	1.93c	8 10 0	2.10c	700	1.47c	700	2.27c	127
Sheets, black	2.34c	10 5 0§	2.55c	850‡	1.63c	775‡	2.58c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.89c	12 15 0	4.35c	1,450	3.15c	1,500	6.62c	370
Plain wire	2.10c	9 5 0	3.39c	1,130	2.31c	1,100	3.10c	173
Bands and strips	2.38c	10 10 0	1.95c	650	1.47c	700	2.27c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. (a) del. Middlesbrough. (b) hematite

Bars

Bar Prices, Page 42

Pittsburgh—In view of the recent reduction in hot-rolled strip steel at Pittsburgh, carbon steel bars at 1.75c reflect a disparity from the new 1.70c price on strip steel. Heretofore these markets had been the same. Little change has occurred in demand for bars. Alloy bars still are based at 2.45c, Pittsburgh.

Cleveland—Bar specifications from automotive and other leading consumers continue active. One-third February tonnage booked by an important steelmaker in this district was made up of bars while plates and shapes combined represented little more than one-half the bar entries. No change in the price from 1.80c, base, Cleveland, for soft steel bars, is expected, with books for second quarter to be opened March 1.

Chicago—Improvement in steel bar specifications and sales is consistent, with further gains in demand from automotive and farm implement industries. Second quarter bar orders are postponed until March by code regulations. Prices are expected to continue at recent levels.

Boston—Commercial steel bar demand shows little improvement, but the outlook is better for railroad specifications. For the Springfield, Mass., armory, Crucible Steel Co. of America and Bethlehem Steel Co. were recently awarded small lots, nickel steel going to the latter.

New York—Commercial steel bar tonnage is light, and with no price change in prospect for secand quarter there are few indications of more than a moderate improvement over the next two or three weeks, except from railroads.

Philadelphia—Slightly better inquiry for steel bars is noted but the total is disappointing to most sellers. Reaffirmation of prices is expected.

Cincinnati—Stewart Iron Works Co., Covington, Ky., has been awarded an unstated tonnage of special steel for the federal prison at Alcatraz island, in San Francisco bay.

Plates

Plate Prices, Page 42

Pittsburgh—Pittsburgh plate mills began to benefit last week from orders from the Pennsylvania railroad. Car plates for the Van Sweringen orders have not yet been placed. The barge market remains slow with only a few government inquiries active. Plates continue based at 1.70c, Pittsburgh, with no early change in prospect.

Cleveland — Some builders who shared in the recent award of 12,725 freight cars by the Van Sweringen lines have been assured of releases this week, the interstate commerce commission having formally sanctioned PWA loans. This provides for early rolling of material, including plates. Aside from railroad orders, the market is quiet. Production in February by the Cleveland mill is placed at 30 per cent.

Chicago — While plate demand shows occasional improvement from miscellaneous sources, tonnages generally are not large. Inquiries from oil companies are for miscellaneous construction, in small lots, with more comprehensive programs in prospect.

Boston—Plates continue to move in good volume. Prices are firm at 1.80c, Coatesville, Pa.

New York—With indications pointing to unchanged prices for second quarter consumers of plates are specifying deliveries against contracts. Railroad tonnage is increasing slowly, with probability of substantial releases within the next three or four weeks. The market is 1.80c, Coatesville, Pa., or 1.98c, New York.

Philadelphia — Releases by the Pennsylvania for its carbuilding program are stimulating the generally dull plate market. Additional releases for car repairs by the Reading are expected soon. Prices are expected to be reaffirmed for second quarter.

Contracts Placed

210 tons, tanks, Atlantic Refining Co., Point Breeze, Pa., to Chicago Bridge & Iron Works, Chicago.

200 tons, 65,000-barrel tank for George H. Corse, Stockton, Calif.; to Chicago Bridge & Iron Works, Chicago.

130 tons, tanks, A. R. Transportation Co., Brooklyn, N. Y., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

350 tons, elevated steel tank, Temple, Tex.; bids Feb. 23; J. Rady, Waco, Tex., engineer.

Unstated tonnage, 250,000-gallon elevated steel tank, and cast pipe, Athens, Tex.; Willard & Conrad, Houston, Tex., engineers.

Unstated tonnage, two super-side wheel 34-inch suction dredges for Kansas City engineers; bids postponed for the third time until Feb. 24.

In December Alaska bought 1 ton of cast iron pipe and fittings and 25 tons of welded and riveted pipe and fittings from the United States.

Sheets

Sheet Prices, Page 42

Pittsburgh—Although the average of sheet mill operations is above 50 per cent for the industry, Pittsburgh district sheet mill production last week was at 43 per cent. Buying still originates largely from automotive consumers. A $2 a ton reduction on hot-rolled pickled in the breakdown annealed deoxidized sheets becomes effective March 2 and places the Pittsburgh base at 2.65c for No. 24 gage. This reduction is attributed to pressure for a cut by a leading automobile manufacturer. Other sheet prices are unchanged, with black 2.25c; galvanized 2.85c; and 20 gage cold-rolled 2.75c.

Cleveland—Sheetmakers expect to open books for second quarter contracts March 1. In view of countinuing pressure for automobile material it is regarded as likely consumers in this field will close for requirements early in the month to insure good position in rolling schedules. Mills here and in an adjacent lake district still are operating at capacity to complete first quarter specifications, and during the week some sellers had to decline some tonnage for delivery before April 1. Washing machine and refrigerator manufacturers also are active, and business in other miscellaneous lines is fair. While the price situation has not been entirely clarified, sellers last week said they were not anticipating an advance. Some revisions may be made in gage and size extras.

Chicago—Contrary to previous expectations, sheet prices are being continued into second quarter at recent levels, with the exception of the reduction of $2 a ton on hot-rolled pickled in the breakdown annealed sheets. Business from practically all types of consumers continues to improve gradually. Heavy shipments of cold-rolled sheets are in prospect for well into the second quarter. Construction of tunnels for the Chicago sanitary district program will require a large steel tonnage for facing, to consist of small flat rolled steel sections. This type of support, if employed for all ten units, will involve about 10,000 tons of steel.

Boston—Miscellaneous sheet buying has gained slightly. Specifications, however, generally are limited to car lots for early delivery.

Buffalo—Demand for automotive and other grades of sheets continues active, with local mills operating at 80 per cent.

New York — Sheet trading has slowed up, with prospects of an ad-

vance for second quarter having become practically dissipated. As many consumers have anticipated requirements there may be less specifying for a while.

Philadelphia — Recent filing of prices on a special classification of sheets used by the automobile industry at $2 a ton under certain competitive grades at Gary, Ind., and Pittsburgh, leaves the trade somewhat uncertain. Automotive orders here, however, feature the market.

Cincinnati—Demand from automobile interests for sheets continues heavy and added to this is an improvement in specifications for refrigerator manufacturers. Production in this district is at about 70 per cent.

St. Louis—Sheet orders continue to broaden, with especially good specifications for galvanized material. The improvement is not attributable to heavy buying by the most important consumers, but to the miscellaneous requirements.

Railroads

Track Material Prices, Page 43

Price of $36.37½, for steel rails, expiring March 1, will in all probability be extended. The New York Central opening on 40,000 tons of rail, exclusive of accessories, scheduled for Feb. 28, is a feature of the market.

Interstate commerce commission has under consideration approval of a number of loans to railroads by the PWA, as follows: Erie, $2,048,000 for 32,121 tons of rails and 12,340 tons of fastenings and 623,000 for rebuilding 750 coal cars into self-clearing hoppers; Chicago, Milwaukee, St Paul & Pacific, $2,917,383 for 20,000 tons of rails, 300 auto loaders; New York, Ontario & Western, $235,000 for 4725 tons of rails and 1751 tons of fastenings; Delaware, Lackawanna & Western, $4,666,000 for 20 steam locomotives, five oil-electric locomotives, 500 hopper cars and rebuilding; Lehigh Valley, $600,000 for five locomotives; Pittsburgh & West Virginia, $345,000 for three locomotives; Baltimore & Ohio, $1,500,000 to apply on rail purchases of $2,350,406

Loan of $5,028,000 to the Nickel Plate for 20 locomotives and 1200 cars has been confirmed by signed contracts. Seaboard Air Line will ask a loan of $3,000,000 for five locomotives and 1100 cars.

Approval has been given to a loan of $8,187,383 to the Chicago, Milwaukee, St. Paul & Pacific for 30 freight locomotives, 25 baggage-express cars and 50 coaches.

Baltimore & Ohio signifies it will inquire for 35,000 tons of rails this week, on approval of its PWA loan.

Federal court at St. Louis has authorized trustees of the St. Louis & San Francisco to spend $1,433,053 for additions and betterments, including 100 miles of rails, and car repairs.

Chesapeake & Ohio has placed slightly more than 600 tons of screw spikes with four or five makers.

Chicago & North Western is preparing to distribute 26,514 tons of rails, in addition to fastenings, for which financing has been arranged.

Releases by the Pennsylvania against orders for car material include about 20,000 tons of plates, 14,000 tons of sheets, 4200 tons of strip and 3000 tons of bars.

With placing of 12,725 cars by the Van Sweringen lines, final negotiations for construction of 6500 by the Pennsylvania in its own shops and 500 for the Lehigh & New England, domestic freight car awards this month will be the heaviest for any month in several years. February awards will exceed the total cars placed in the three preceding years. The largest previous monthly total was 17,027 cars, in February, 1930.

In January, 1934 total car awards were 152. Comparisons are as follows:

	1934	1933	1932	1931
Jan.	152	3	159	100
Feb.	.....	0	35	50
March	.....	5	105	2,166
April	.....	50	0	2,798
May	.....	8	60	20
June	.....	500	0	1,910
July	.....	306	25	617
Aug.	.....	202	5	1,304
Sept.	.....	23	1,298	703
Oct.	.....	514	0	980
Nov.	.....	533	2	35
Dec.	.....	316	50	11
Total	.....	2,460	1,739	10,694

Car Orders Pending

Chicago, Milwaukee, St. Paul & Pacific, 50 passenger coaches and 25 baggage-express cars; PWA loan of $1,716,000 approved.

Gulf, Mobile & Northern, 50 composite gondolas; inquiry expected out shortly.

Locomotives Pending

Chicago, Milwaukee, St. Paul & Pacific, 30 freight locomotives; PWA loan of $4,004,000 approved.

Rail Orders Pending

Baltimore & Ohio, 35,000 tons; interstate commerce commission approval requested.

New York Central, steel rail requirements, probably 35,000 to 40,000 tons; bids Feb. 28.

Pipe

Pipe Prices, Page 43

Pittsburgh—Part of the proposal to raise steel prices for the second quarter involved a revision in the skelp price, and with establishment of conversion costs for all grades of finished pipe, changes in pipe discounts were contemplated. However, the past week saw this proposal discarded and tubular products' discounts continue unchanged. Demand is light and pipe producers are able to schedule only occasional operations in the normally important sizes.

Chicago—Releases are slow to be received against old orders for cast iron pipe and new bookings are light. Shipments against awards made several months ago for work financed by federal funds still are deferred. New bids are expected to be asked on 1250 tons of 12-inch pipe for a Cook county infirmary.

Boston—Cast pipe inquiry holds fairly well with considerable tonnage approaching the active point as financing is being negotiated. Replacement of a pipeline at the naval oil depot, Melville, R. I., requires fair volume of steel and wrought pipe.

New York—Except for a large inquiry involving 24-inch cast pipe for Watervliet, N. Y., closing March 9, demand is light. A few state hospital projects take small lots, but CWA requirements have not developed in volume.

Buffalo—Large-scale construction is said to be contemplated in the western New York and northern Pennsylvania oil and gas fields in the spring and summer months, and pipe dealers are negotiating for many round lots for delivery in these regions.

Birmingham, Ala. — Pipe shops have not increased operations materially, but more than one of these interests report prospects bright. Birmingham plants expect to manufacture a large proportion of a Porto Rican order for 6000 tons of cast pipe.

Cast Pipe Placed

450 tons, 8-inch and under, Tipton, Mo., to National Cast Iron Pipe Co., Birmingham, Ala.

384 tons, 8 to 12-inch, class 150, Fresno, Calif., to R. D. Wood & Co., Emaus, Pa.

Steel Pipe Placed

2000 tons, 16-inch, spiralweld, copper-molybdenum iron, gas line in Texas Panhandle, for Coltexo Corp., Monroe, La., to Naylor Pipe Co., Chicago.

150 tons, pontoon pipe for United

States engineer, Sacramento, Calif., to Pacific Coast Engineering Co., Oakland, Calif.

Cast Pipe Pending

2700 tons, 8 and 24-inch, Watervliet, N. Y.; bids March 9.

628 tons, 16-inch class B or 200, East Bay municipal utility district, Oakland, Calif.; United States Pipe & Foundry Co., Birmingham, Ala., low; alternate bids taken on welded steel pipe.

Unstated tonnage, 9½ miles, 10-inch, watermain for $152,000 water system, Wartrace, Tex.; C. N. Harrub Engineering Co., Nashville, Tenn., engineer.

Steel Pipe Pending

450 tons, boiler tubes, Philadelphia Electric Co., Philadelphia; bids soon.

208 tons, 16-inch welded, ½-inch plate, East bay municipal utility district, Oakland, Calif.; Steel Tank & Pipe Co., Berkeley, Calif., low; alternate bids taken on cast iron.

Wire

Wire Prices, Page 43

Pittsburgh — Little change has occurred in wire buying by merchant or the manufacturing trades and current specifications are largely small, for immediate shipment. The market holds at $2.35 per keg for nails, 2.20c on plain wire and specialties unchanged.

Truscon Steel Co., Youngstown, O., will fabricate approximately 76 miles of galvanized wire fabric for army engineers at New Orleans, for bank mattresses for flood control.

Cleveland—February wire tonnage was substantially heavier than January, with shipments continuing to rise. Few inquries have been received for second quarter. While prices for second quarter have not been determined, no advance is anticipated by some sellers.

Chicago—Wire demand continues to tend upward and February shipments will show a substantial increase over those of January. The upturn in automotive requirements, while an important factor in stimulating activity, has been accompanied by a moderate expansion in needs of miscellaneous users of manufacturers' wire and a small upturn in specifications from jobbers. Wire prices are expected to continue unchanged.

Boston—Demand for wire specialties and manufacturers' wire is unchanged, with recent gains fairly well held. Plain bright wire is 2.30c, Worcester, Mass.

New York—Wire prices in general will be reaffirmed for second quarter, from all indications. Buying remains quiet, although improved inquiry in some lines is expected soon.

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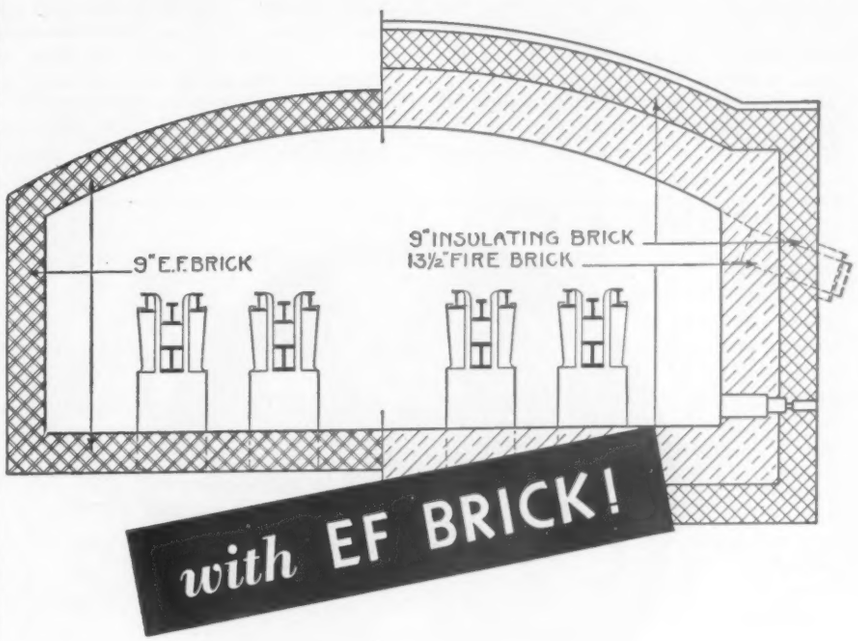

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THREE INSULATING BRICK FOR INDUSTRIAL FURNACES

Shapes

Structural Shape Prices, Page 42

Pittsburgh—American Bridge Co. has formally booked 2660 tons for the Alton, Ill., lock from a Chicago contractor, but other awards of the past week have been small and infrequent. County commissioners at Mercer, Pa., open bids Feb. 26 for construction, widening and repairing eight bridges. Plain structural shapes continue quoted 1.70c base, Pittsburgh. Steel sheet piling holds at 2.00c base, Pittsburgh.

Cleveland—Keen competition still exists among structural fabricators, with current demand in this district limited to small lots. Bids last week on an industrial mill building in Cleveland requiring several hundred tons are reported to have shown a variation of $32 a ton, erected, bidders submitting their own designs for building. Public works awards are light.

The war department has awarded Fort Pitt Bridge Works, Pittsburgh, 340 tons for a static test laboratory at Wright Field, Dayton, O., and is taking bids March 1 on 500 tons for a technical data building there.

Pennsylvania railroad is taking bids for replacing coal dock No. 24, Cleveland, requiring 195 tons of steel piling and other miscellaneous steel.

Chicago—Bridge work comprises principal awards and inquiries. Three bridges in Oregon require 5150 tons. Bids have been opened on two Illinois bridges taking 2000 tons. For the Mississippi river lock at Dubuque, 1500 tons of piling have been placed. Other orders include 1000 tons for an Illinois Central railroad bridge in Louisiana and 400 tons for a Chicago pumping station.

Boston—Bids close March 5 on the superstructure for the Fore river bridge, Quincy-Weymouth, Mass., requiring 5000 tons of structural steel. While current lettings are light, a substantial volume is gradually approaching bids.

New York—With new bids in on the 12,000-ton Manhattan postoffice project, active structural requirements in the metropolitan district do not exceed 20,000 tons, including the midtown Hudson river tunnel shafts, and state hospitals and bridges in New York and New Jersey.

Philadelphia—Fabricators expect specifications shortly for the Camden, N. J., approach to the high-speed line over the Delaware river bridge. The approach requires 3000 tons of shapes, 2500 tons of steel piling, and over 800 tons of concrete bars.

Inquiry has been revived for a privately financed hangar in Richmond, Va., requiring 2600 tons of shapes and 215 tons of plates.

Contracts Placed

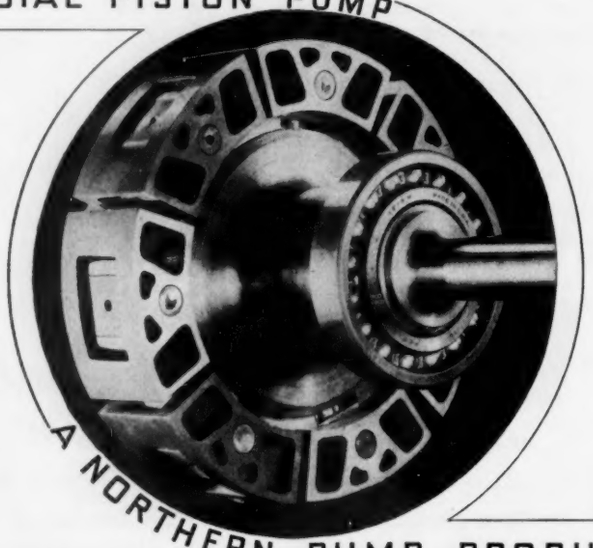
3500 tons, including piling, anchor rods, bolts, nuts, turnbuckles, army quartermaster base, Boston, to Kalman Steel Corp., Bethlehem, Pa.

1500 tons, piling, lock No. 11, Du-

Shape Awards Compared

	Tons
Week ended Feb. 24	13,391
Week ended Feb. 17	34,751
Week ended Feb. 10	15,540
This week in 1933	5,347
Weekly average for 1933	15,413
Weekly average 1934	18,580
Weekly average January	17,481
Total to date 1933	81,857
Total to date 1934	148,638

RADIAL PISTON PUMP



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buque, Iowa, to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, Illinois Central railroad bridge, La Branch, La., to Virginia Bridge & Iron Co., Roanoke, Va.

1000 tons, Calvert street bridge, Washington, to Mt. Vernon Bridge Co., Mt. Vernon, O.; reported last week as awarded to another fabricator.

700 tons, piling substructure, Fore river bridge, Quincy-Weymouth, Mass., to Kalman Steel Corp., Bethlehem, Pa.; through V. Barletta Co.

700 tons, gymnasium, military academy, West Point, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.; C. T. Wills Inc., New York, general contractor.

525 tons, highway bridges, Missouri, to Stupp Bros. Bridge & Iron Co., St. Louis.

450 tons, also galvanized steel products and castings for Pearl Harbor T. H., improvement, to Pacific Car & Foundry Co., Pacific Coast Forge Co. and Olympic Foundry Co., Seattle.

440 tons, for crossing over Owyhee river, Oregon, to Chicago Bridge & Iron Works, Chicago.

410 tons, ordinance shop, Fort Bragg, N. C., to Southern Engineering Co., Charlotte, N. C.

400 tons, pumping station, Chicago, to McClintic-Marshall Corp., Bethlehem, Pa.

400 tons, two truck and four tank sheds, Fort Benning, Georgia, to Converse Bridge & Steel Co., Chattanooga, Tenn.; Rogers & Leventhal, Chattanooga, general contractors.

340 tons, static test laboratory for war department at Wright Field, Dayton, O., to Fort Pitt Bridge Works, Pittsburgh.

330 tons, highway bridges, Rocks, Md., and Chestertown, Md., to Fort Pitt Bridge Works, Pittsburgh.

300 tons, warehouse for American Potash & Chemical Co., Trona, Calif., to Ingalls Iron Works Co., Birmingham, Ala.

270 tons, warehouse, Fort Humphreys, Va., to McClintic-Marshall Corp., Bethlehem, Pa.

250 tons, bridge, NRS-357-A, Seminole county, Oklahoma, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

240 tons, dope house for United States army aircraft service, Middletown, Pa., to McClintic-Marshall Corp., Bethlehem Pa.

215 tons, bridge, NRS-358-A, Pottawatomie county, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City.

155 tons, bracing for Lincoln junior high school, Santa Monica, Calif., to Pacific Iron & Steel Co., Los Angeles.

155 tons, ordnance magazines, Aberdeen, Md., to Dietrich Bros., Baltimore.

150 tons, Home for Incurables, Philadelphia, to Robinson Iron & Steel Co., Philadelphia.

150 tons, bridge, Saline county, Kansas, to Capitol Steel & Iron Co., Oklahoma City, Okla.

140 tons, bridge, Harford county, Maryland, to Fort Pitt Bridge Works, Pittsburgh; through Maryland Engineering & Construction Co. Dietrich Bros., Baltimore, awarded 25 tons of concrete bars.

135 tons, state highway bridge, Erie county, Pennsylvania, to McClintic-Marshall Corp., Bethlehem, Pa.; through Bates & Rodgers Co., Cleveland. Job also takes 125 tons of concrete bars, and 13,650 pounds of cast iron plates, awarded to other interests.

120 tons, bid No. 19806, metropolitan water district, Los Angeles, 60 tons to McClintic-Marshall Corp., Los Angeles, and 60 to Commercial Shearing & Stamping Co., Los Angeles.

116 tons, shapes and bars, bridge, Prince George county, Maryland, to McClintic-Marshall Corp., and Kalman Steel Corp., Bethlehem, Pa.; through Consolidated Engineering Co.

100 tons, office building, board of water commissioners, Wilmington, Del., to McClintic-Marshall Corp., Bethlehem, Pa.; H. E. Baton Inc., Philadelphia, general contractor.

100 tons, bridge, Catawba river, Maryland, to Virginia Bridge & Iron Co., Roanoke, Va.; through Kiker & Yount. Knoxville Iron Co., Knoxville, Tenn., awarded 41 tons of concrete bars.

100 tons, emergency lock, Alton, Ill., to Midland Structural Steel Co., Chicago.

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Contracts Pending

12,000 tons, superstructure, midtown postoffice Manhattan, New York; James Stewart & Co. Inc., New York, low on general contract; bids Feb. 21.

5000 tons, radio towers, Summit, Canal Zone, and Lualuaei, T. H., navy department, bureau of yards and docks; United States Steel Products Co., Washington, low on all but one alternate; bids Feb. 14.

3200 tons, sheet piling, bulkhead, Government Island, Oakland, Calif.; new bids March 1.

2000 tons, tunnel shafts, midtown tunnel, Manhattan-Weehawken, N. J. for Port Authority of New York; Mason & Hanger Co. Inc., New York, low on general contract; bids Feb. 21.

1500 tons, bridge, Henry, Ill.; McClintic-Marshall Corp., low.

940 tons, Pequannock river viaduct, Passaic, N. Y.

815 tons, truss bridge, Perry county, Pennsylvania; bids March 9.

740 tons, bridge, Fredericksburg, Va.

520 tons, bridge near Jacksonville, Ill.; Illinois Steel Bridge Co., Jacksonville, low.

510 tons, six small highway bridges, various locations, Iowa.

500 tons, technical data building for war department, at Wright Field, Dayton, O.; bids March 1.

400 tons, state administration and laboratory building, Saratoga Springs, N. Y.

350 tons, bridge, Brookville, Ind.

330 tons, highway bridge, Roanoke, Va.

255 tons, underpass, route 25, Elizabeth, N. J.; bids March 12.

200 tons, headquarters building, Fort Monmouth, N. J.

195 tons, including 175 tons of piling and 20 tons of bars and rods, replacing Pennsylvania railroad dock No. 24 at Cleveland; bids being taken.

175 tons, government storehouse, Aberdeen, Md.

175 tons, building, Coal Creek, Tenn.

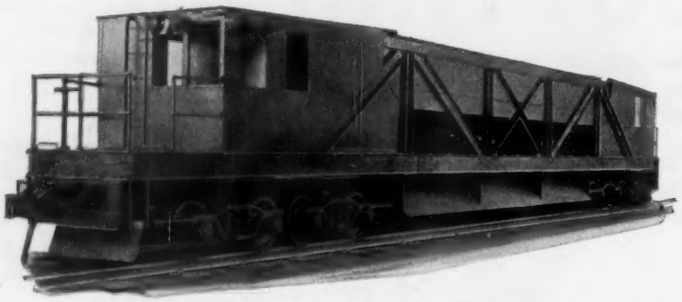
150 tons, piling, waterworks, Evanston, Ill.

150 tons, government garage, Aberdeen, Md.

150 tons, conveyor galleries and supports, crushing and screening plant, Norris dam, near Coal Creek, Tenn., for Tennessee Valley Authority; Ingalls Iron Works Co., Birmingham, Ala., low, $10,500; bids Feb. 6.

Unstated tonnage, 18-story administration building for Hydro-Electric Power Commission of Ontario, Canada; bids March 7 at Toronto. Canadian materials specified. Structure to be air-conditioned throughout.

ATLAS ORE TRANSFERS



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CLEVELAND, OHIO

Reinforcing

Reinforcing Bar Prices, Page 43

Pittsburgh—Reinforcing steel bar projects continue to be supported almost entirely by federal-sponsored building. A large number of bar suppliers bid on 3000 tons for Boulder dam Feb. 23, award on which is awaited. Reinforcing steel holds at 1.90c, Pittsburgh, with little change in prospect for the second quarter.

New York—New demand here is restricted to several hundred tons, mainly for highways and bridges.

Cleveland—Reinforcing bar purchases are limited to small lots for miscellaneous purposes, with little developing from public work. An award of 125 tons to a Cleveland

Concrete Awards Compared

	Tons
Weew ended Feb. 24	3,560
Week ended Feb. 17	5,206
Week ended Feb. 10	2,684
This week in 1933	5,848
Weekly average for 1933	3,771
Weekly average 1934	4,140
Weekly average, January	4,862
Total to date 1933	31,549
Total to date 1934	33,126

fabricator for a state bridge in Erie county, Pennsylvania, is outstanding in a quiet market.

Chicago—Between 1250 and 1500 tons of bars are involved in two commercial buildings here, one for Sears, Roebuck & Co. and the other for the Campbell Soup Co. Bids will be taken within two weeks on another tunnel for Chicago sanitary district construction, with awards awaited on about 2000 tons required in three units on which bids have been received. Ten tunnels in all are planned, taking 8000 tons of bars.

Boston — Bridges and highway projects furnish the bulk of inquiry, highways in Connecticut requiring close to 300 tons which contractors are expected to place shortly.

Philadelphia — Reinforcing bar buying is light, with state bridge work slow. Prices are unchanged at 2.19c, Philadelphia, for cut lengths.

Contracts Placed

700 tons, sewage tunnel, Chicago, for distribution by unnamed fabricators to Illinois Steel Co., Chicago.

575 tons, lock No. 10, Guttenberg, Iowa, to Kalman Steel Corp., Bethlehem, Pa.

550 tons, substructure, Fore river bridge, Quincy-Weymouth, Mass., to Kalman Steel Corp.; through V. Barletta Co.

500 tons, concrete lock, No. 11, at Dubuque, Iowa, to Kalman Steel Corp., Bethlehem, Pa.

400 tons, highway projects, Brooklyn, N. Y., to a Brooklyn fabricator; through W. W. Construction Co., New York.

200 tons, highway, Pensacola, Fla., to Truscon Steel Co., Youngstown, O.; Noonan Construction Co., Pensacola, general contractor.

200 tons, ten silos for Santa Cruz Portland Cement Co., Stockton, Calif., to Gunn, Carle & Co., San Francisco.

180 tons, gymnasium, Military Academy, West Point, N. Y., to Kalman Steel Corp.; Bethlehem, Pa.

160 tons, building in Milwaukee, to Concrete Steel Co., Chicago.

150 tons, or more, bars and shapes, sheds, warehouses, ordnance shop, Fort Sam Houston, Tex., to Alamo Iron Works, San Antonio, Tex. Brandt Iron Works awarded structural material for gun shed.

150 tons, Illinois road work, to Concrete Steel Co., Chicago.

125 tons, highway, Connecticut, to Truscon Steel Co., Youngstown, O.

125 tons, state highway bridge, Erie county, Pennsylvania, to Patterson-Leitch Co., Cleveland; through Bates & Rodgers Co., Cleveland. Job also takes 135 tons of structural shapes awarded to other interests.

100 tons, office building for board of water commissioners, Wilmington, Del., to Concrete Steel Co.; H. E. Baton Inc., Philadelphia, general contractor.

100 tons, bars and shapes, hospital buildings, treasury department, Baltimore, to National Building Supply Co., Baltimore, and Ornamental Iron Works Co., Akron, O.; M. A. Long Co., Baltimore, general contractor.

100 tons, state highway work in four counties in Colorado, to unnamed interests.

100 tons, stock house for Milwaukee Brewery, San Francisco, to Gunn, Carle & Co., San Francisco.

100 tons, stockhouse for Golden West Brewery, Oakland, Calif., to Gunn, Carle & Co., San Francisco.

100 tons, Wisconsin road work, to Concrete Steel Co., Chicago.

Unstated tonnage, group headquarters and operations building, Barksdale Field, La. to Jones & Laughlin Steel Corp., Pittsburgh; R. P. Farnsworth & Co. Inc., New Orleans, general contractors.

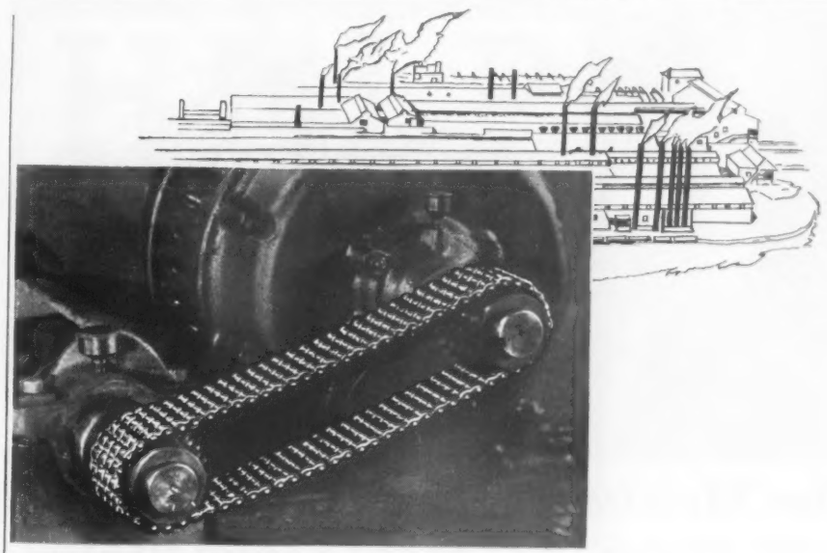
Contracts Pending

3000 tons, Boulder dam project, bids Feb. 23 to engineers office at Denver.

850 tons, including 100 tons of mesh, Hudson river tunnel, Manhattan-Weehawken, N. J.; Mason & Hanger Co. Inc., low on general contract.

300 tons, waterworks, Evanston, Ill.

750 tons, retail store, Sears, Roebuck



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ROLLING ~ AT POINTS OF CONTACT

& Co., Chicago; B-W Construction Co., Chicago, general contractor.

750 tons, tunnel, Chicago sewage system; Nash Bros., Chicago, awarded general contract. Bids to be asked soon on additional units.

500 tons, factory, Chicago, for Campbell Soup Co.

140 tons, highway projects, Arkansas; bids Feb. 28.

171 tons, state highway work in Gallaintin and Lake Counties, Montana; bids Feb. 24.

100 tons, bridge, Perry county, Pennsylvania; bids March 9.

Strip Steel

Strip Prices, Page 43

Philadelphia—It is reported here the recent reductions of $1 a ton on hot strip at Chicago and Pittsburgh have been withdrawn, with indications now there will be no change for second quarter. Nevertheless, the trade is unsettled by recent developments. With no changes posted to date some trade leaders look for extension of current prices on ordinary grades.

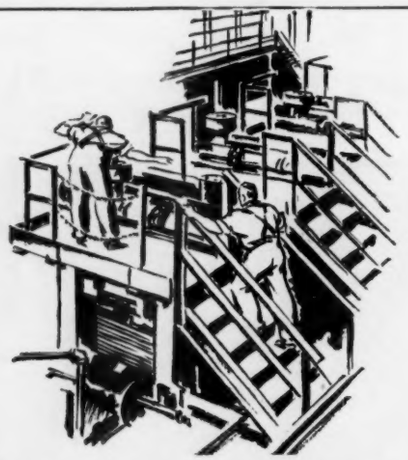
Pittsburgh—Although a reduction of $1 a ton in hot-rolled strip was filed Feb. 20 by a Pittsburgh district producer, which would make the market 1.70c base, Pittsburgh, March 2, efforts to nullify this reduction were known to be under way last week. Some strip producers who were not sympathetic to the reduction expect 1.75c, base, Pittsburgh, market will be reinstated. Discussion over the hot-rolled strip price has not affected the cold-rolled market which holds at 2.40c, Pittsburgh. Demand continues heavy for all grades of strip steel.

Cleveland — Demand continues strong, with most specifications from automotive interests, mainly for immediate shipment. Makers are practically sold up for this quarter. More than one-third of an important producers' miscellaneous steel tonnage in February was hot-rolled strip.

Chicago—Cold-rolled strip demand is led by expanding needs of automotive interests. Hot-rolled strip business also is improving, miscellaneous stamping producers showing betterment in operations. Some stripmakers here have refiled the old price of 1.85c, Chicago on hot-rolled.

Boston—Cold strip buying continues light. In a few instances rerollers have bought hot strip in better volume. Industrial demand is slightly heavier. Cold strip is steady at 2.60c, Worcester, Mass.

New York—A reduction of $1 per ton in hot strip at Pittsburgh, effective March 2, limited trading here in hot-rolled and cold-rolled strip, but withdrawal of the reduction has clarified the situation.



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Semifinished

Semifinished Prices, Page 43

A proposal of ten days ago to advance billets $2 to $28, Pittsburgh, and sheets bars $3 a ton to $29, Pittsburgh, has been definitely discarded for the time being. Sheet bars demand is the heaviest in semifinished steel. The automottive industry has been taking heavier tonnages of forging billets, but wire rods are moving slowly.

Cold Finished

Cold Finished Prices, Page 43

Pittsburgh—The first week of February was the only one which accounted for sizable specifications of cold-finished steel bars. Since then the volume of orders has been light.

Pig Iron

Pig Iron Prices, Page 44

Pittsburgh — Effective Feb. 26, basic pig iron is quoted $17, Neville Island, a 50-cent reduction. This new price has not stimulated basic buying but makes the Neville Island base price on a parity with Sharpsville, Pa., and Youngstown, O., basing points. Bessemer at $18.50, Neville Island, and foundry iron at $18, are unchanged. Demand in steel mill rolls and ingot molds is accounting for a large share of present shipments. The Neville Island stack of the Davison Coke & Iron Co., the only active merchant stack in this vicinity, is resuming blast after having been banked for a week.

Cleveland—Steady increase in the melt is an encouraging feature. Shipments by merchant furnace interests in February were approximately 30 per cent heavier than in January. Meanwhile, consumers have been reducing their own stocks. Automotive buyers are expected to be in the market for large tonnages shortly. Sales volume is steady. Producers expect to open books for first quarter March 1, with no price change in immediate prospect.

Chicago — With February shipments recording a gain of more than 25 per cent over those of January, rising foundry operations point to a continuation of expanding deliveries during March. The movement still is below the December rate, but stocks accumulated at that time are being reduced. The market continues $17.50, furnace, for No. 2 foundry and malleable.

Boston — With second quarter prices unchanged in New England, a steady volume of small shipments continues. Indications are that buying next quarter will be slightly heavier and more evenly distributed as to shipping periods. Several hundred tons of Indian iron has been sold at code prices, but some Dutch iron is moved by the waiving of silicon differentials, notably in southern New England.

Philadelphia—Although no price change appears likely, pig iron is moving at a much better rate, but mostly against contracts.

Buffalo—With sellers about to open books for second quarter, opinion is growing that no major price changes are likely. Shipments are improving steadily.

Cincinnati—New orders are limited to small lots, but moderate improvement in shipments is noted this month, compared with January. Several inquiries from important melters are pending.

St. Louis—More foundries are entering the market and present indications are that February sales will exceed those for January. With increased mill activity in this district, inquiries for basic are expected. January business for jobbing foundries was over 100 per cent ahead of the same month on 1933.

Birmingham, Ala.—Small orders still predominate and total business is not up to expectations. Production is steady with ten blast furnaces in operation. Majority of miners at Raimund ore mines of Republic Steel Corp. have returned to work after several weeks' layoff.

Toronto, Ont.—Merchant sales are improving. Pig iron production in January exceeded 30,000 tons with four stacks operating. Prices are firm.

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Scrap

Scrap Prices, Page 45

Pittsburgh—Although the market holds steady at $14 to $14.50 for No. 1 heavy melting steel, willingness of dealers to pay $14.50 for coverage on a recent order at the same price indicates higher prices will be paid by mills shortly. A district mill last week purchased hydraulic compressed sheets in some tonnage, paying $14.50. Machine shop turnings are up 50 cents a ton to $10.75 to $11.25, although blast furnace scrap has not shown much life. Specialties have been inactive.

Chicago—Heavy melting steel is quoted 50 cents higher at $11 to $11.50. Dealers find scrap available only at $11 or more, and although mills are not interested in placing large orders they have advanced their offering price. Only moderate tonnages are being sold and shipments against old orders fail to reflect the sharp upturn in steelmaking operations. With available supplies limited sellers are unwilling to make heavy short commitments. Prices on all scrap grades are strong with several higher.

Cleveland—Advances of 25 to 75 cents have been made on most grades of steel and iron scrap, in view of continued active demand of consumers of heavy grades for prompt shipment. Holders of scrap are unwilling to sell at current quotations.

Boston—Strength in the Pittsburgh district on heavy melting steel and several other grades has caused local consumers to revise bids upward. Worcester, Mass., is reported to have offered $10 for No. 1, delivered, and has raised its price for No. 2. The latter grade is coming out more freely.

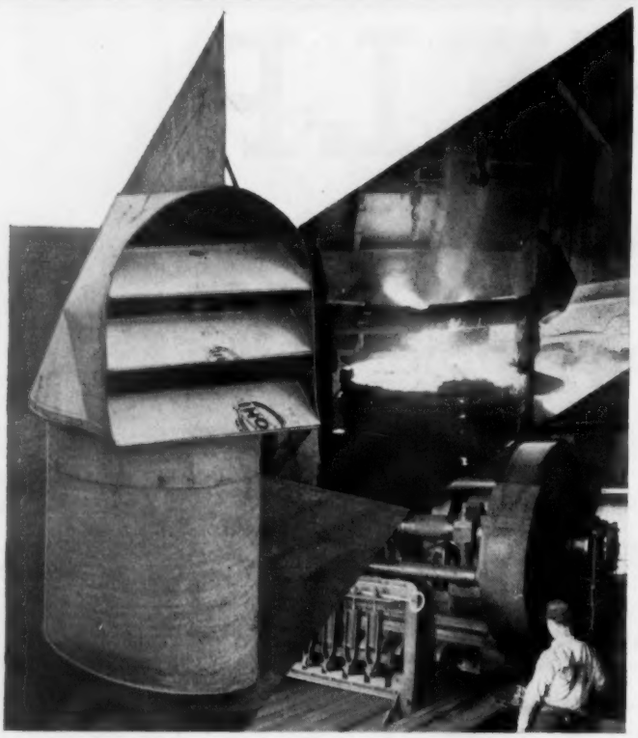
New York—Prices of steel and iron scrap are firm but there is not much new buying, although Pencoyd, Pa., is taking some No. 2 at $9.50, delivered. Heavy melting grades for barge loading are unchanged. A Florence, N. J., foundry is paying $10.50 for No. 2 cast, delivered. Considerable scrap is being held on lighters pending return of recent export demand. Most mills are holding back shipments.

Philadelphia — Scarcity of cast grades of scrap features the market and prices are higher. Heavy melting steel is moving more freely against contracts. Japan and England are inquiring for No. 1 and 2 steel and Italy and Poland for No. 2. Little tonnage is being placed, pending price agreement. Bethlehem Steel Co. has bought 5000 tons of steel at $12, delivered, Lackawanna, N. Y., a dollar above recent purchases.

Buffalo—Demand for scrap continues active but dealers demand higher prices than consumers are willing to pay and buying has been checked. Bethlehem is said to have been unable to obtain additional tonnage of heavy melting steel on its offer of $12 for No. 1 heavy melting steel and $10.50 for No. 2 and substitutes.

Detroit—The market last week advanced 50 cents a ton on important open-hearth grades and 25 cents to $1 on others. No. 1 heavy melting steel and compressed sheets are $10 to $10.50. Machine shop and short shoveling turnings and blast furnace borings are 25 cents higher. Heavy auto cast is up $1 a ton on a sudden increase in demand.

Cincinnati—Prices of iron and steel scrap are nominally unchanged, although slightly higher prices than in January were paid on railroad



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lists this month. Dealers see in the rate of operations a strong undertone, so that yard scrap is being closely held.

St. Louis—Iron and steel scrap continues strong, prices of a number of important grades mounting to new highs.

While actual sales do not represent a large total, there is an active inquiry, especially for steel grades, and if buyers and sellers could arrive at terms, a heavy turnover would ensue.

Birmingham, Ala.—The scrap iron and steel market is quiet with occasional tonnage of heavy melting steel moving. Only one of the larger consumers of this class of material is buying and then in small quantities.

Toronto, Ont.—While trading in iron and steel scrap is still specialized the more active list is expanding. Local dealers report a good demand for most iron grades, with sales in cast and wrought scrap. Steel grades are beginning to pick up. Canadian mills are taking delivery on special grades in small lots. Dealers look for an active market for steel scrap against export account next spring.

Warehouse

Warehouse Prices, Page 46

Cleveland—The daily average of warehouse business in February for some sellers has been larger than in January, but the total for the month will be less due to the shorter month. The market is brighter, with the number of orders continuing to increase. Prices are steady.

Chicago — Sales are improving steadily and increases are noted compared with January and the corresponding 1933 period. Prices of cold-finished sheets have been advanced $5 a ton. Other quotations are unchanged.

Boston—With one or two exceptions warehouses note a slight decline in volume, although buying continues well diversified, with prices firm.

New York—Warehouse volume dropped last week due to the holiday and severe weather. Several large jobbers, however, are ahead of January volume.

Philadelphia — Orders to warehouses are more numerous but total volume of sales is unchanged. Jobbers report greater uniformity in prices of alloy products.

Detroit—Steel warehouse sales held better through February than in January, the third consecutive monthly gain. Common and cement coated nails are $2.90 per keg for in-town delivery and carriage and machine bolts are higher at 60 off list.

Cincinnati—Warehouse conditions are unchanged, with steady industrial demand maintained. Buying for CWA projects has decreased. Little steel is being taken for building operations.

St. Louis—The volume of warehouse buying is holding up well, and points to a larger February total than in January. Moderate expansion has taken place in general manufacturing demand, and materials for railroad shops and track accessories are moving in larger volume.

Coke

Coke Prices, Page 43

Numerous inquiries and orders continue in furnace coke with the market remaining $3.50, Connellsville, Pa., beehive ovens. Foundry

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coke prices at $4.25 for common grades and $5 base, Connellsville ovens, for premium, are unchanged.

Foundry coke prices at Chicago are expected to continue at present levels in March. The market now is $8.50, ovens, for outside delivery and $9.25, delivered Chicago. February shipments will show an increase of 40 to 50 per cent over January.

Shipments of coke in February at Cincinnati were heavier than in January. Production is being maintained at Birmingham, Ala., with stocks sufficient for immediate needs.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 43

Bolts, nuts and rivets reflect heavier specifications, from miscellaneous sources. Practically no buying for account of car builders has appeared at Pittsburgh. With no incentive to announce second quarter prices, bolt and nut producers continue to hold at 70 off list and rivet makers quote 2.75c base, Pittsburgh, 2.85c, Chicago.

Equipment builders at Chicago are expected to be in the market shortly for requirements for freight and passenger cars placed recently. Some betterment is noted in needs of farm implement manufacturers.

At Cleveland, improvement is more rapid, spreading to all classes of consumers. Producers appear confident of still greater volume for March and April. Demand from the automotive industry is the best since 1929.

The Pennsylvania is negotiating for track bolts for its recent purchase of 100,000 tons of rails.

Equipment

Chicago — Inquiries for various types of machinery and plant equipment continue to improve, while sales so far this month in many instances have been heavier than in January, or February, 1933. Machine tool business recently has been quieter although the month to date has made a favorable record. Inquiries are lacking for machinery and equipment for the Rock Island arsenal. Purchases amounting to $400,000 are planned, although final approval of this appropriation has yet to be made. Early closing on a considerable number of machine tools for various government shops is in prospect. Railroads are inactive in equipment purchases while only miscellaneous orders are appearing from steel producers.

Boston—Machinery buying continues to be centered mainly on special production equipment and several plants specializing on this type of machinery have fair backlogs. Others have booked but a few individual orders. Textile machinery builders are still active, largely for replacement of rayon mill equipment.

Pittsburgh—A builder of mill equipment here has been working on rush schedule to figure a 44-inch blooming mill and finishing mill equipment for the Ford Motor Co. (see pp. 10, 15). Capacity for rolling sheets and strip is sought, in line with the automotive industry's resistance to present steel prices.

Iron Ore

Iron Ore Prices, Page 44

Cleveland—Stocks of Lake Superior iron ore at lower lake docks and furnaces Feb. 1 amounted to 32,973,150 gross tons, according to the Lake Superior Iron Ore association. Furnaces consumed 1,656,303 tons in January, and basing estimates on the trend in consumption, it is figured stocks will be reduced to between 25,000,000 and 26,000,000 tons by May 1. The association's report:

	Gross tons
Consumed in December	1,597,680
Consumed in January	1,656,303
Increase in January	58,623
Consumed in January, 1933	661,116
Ore on hand at furnaces Feb. 1, 1934	27,726,872
On Lake Erie docks Feb. 1, 1934	5,246,278
Total on hand Feb. 1, 1934	32,973,150
Total Feb. 1, 1933	30,812,119

Birmingham, Ala. — A cargo of 6100 tons of manganese ore from Bona, North Africa, has arrived at Fairfield, Ala., for use by the Tennessee Coal, Iron & Railroad Co. The ore was brought to Mobile by a British tramp steamer and then shipped up Warrior river to Birmingport in barges.

Tin Plate

Tin Plate Prices, Page 42

New York—While less voluminous than a fortnight or so ago, tin plate specifications continue to come out freely, with domestic tonnage augmented by foreign requirements. Prices are unchanged.

Pittsburgh — Tin plate mill op-

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erations were steady last week at 70 per cent in this district, this being supported by a 75 per cent rate by a leading producer. A heavy salmon pack expected this year will be reflected in larger demand from the West coast canmakers. Miscellaneous demand for black plate is picking up. The markets on tin mill products hold unchanged at $5.25 per base box for standard coke base tin plate, and 2.65c for 28 gage tin mill black sheets.

Metals

Nonferrous Metal Prices, Page 43, 45

New York—Demand for lead was outstanding in the nonferrous metal market this week. Little change developed in prices.

Copper—Demand was negligible and prices lacked adequate test. First-hand sellers named 8.00c, Connecticut, but resale metal could be had as low as 7.75c. Hearing on the copper code has been postponed until March 9.

Lead—Fair business was done for delivery through March. Prices remained firm at 3.90c, East St. Louis, and 4.00c, New York. A reduction in stocks is looked for in February. St. Joseph Lead Co. will reduce output in the Southwest by 17 per cent March 1.

Zinc—Prices held steady but demand was light. Prime western for delivery through April was quoted 4.40c, East St. Louis.

Tin—One large inquiry for tin appeared late in the week but otherwise buying was on a small scale. Prices tended slightly upward, Straits selling at the close of the period at 52.35c.

Antimony—Prices firmed up somewhat with spot at 7.20c. Futures also were higher.

Silver—Spot metal reached a new high for the past several years at 46.62½c.

Aluminum—Interest chiefly centered in secondary metal. No. 12 still could be had at 15.50c although some asked up to 16.50c. Virgin metal held unchanged.

Coke By-Products

Coke By-Product Prices, Page 43

New York—Demand for distillates has improved, mainly on toluol and benzol. Prices are firm.

Ferroalloys

Ferroalloy Prices, Page 44

Ferromanganese sellers have not as yet indicated what action may be taken on second quarter prices. Meanwhile, the market is $85, duty paid, eastern seaboard. Specifications are increasing, in line with expanding steelmaking operations. Domestic spiegeleisen, 19 to 21 per cent, is holding at $26, furnace, for spot shipment.

Pittsburgh Lectromelt Furnace Corp., Pittsburgh, has installed one of its new 25-pound laboratory-type furnaces in the plant of the Burgess-Parr Co., Moline, Ill. This is a junior size to the 50-pound ladle-type furnace.

Quicksilver

New York—Qiucksilver prices are higher, round lots being quoted $73, a virgin flask of 76 pounds on some fair business. Other sellers are asking $74. Small lots are $73.50 to $74.50.

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Pacific Coast

Pacific Coast Prices, Page 43, 45, 46

San Francisco—(*By Air Mail*)—Bookings of cast iron pipe, plates, shapes and reinforcing bars during the week aggregated close to 7000 tons, and considerable new work is in sight. The largest award involved 384 tons of cast iron pipe for Fresno, Calif., placed with R. D. Wood & Co., Philadelphia. The largest new inquiry calls for 3200 tons of sheet steel piling for a bulkhead at Government island, Oakland, Calif., bids on which will be opened March 1.

Reinforcing bar lettings were the third largest of any week this year, more than 2000 tons. Gunn, Carle & Co. secured 200 tons for ten silos for a cement company at Stockton, Calif., and 100 tons, each, for stockhouses for a brewery in San Francisco and Oakland. Bids have been opened 175

Awards of plates aggregated 350 tons. Chicago Bridge & Iron Works, Chicago, took 200 tons for a 65,000-barrel tank at Stockton, Calif., and Pacific Coast Engineering Co., Oakland, Calif., secured 150 tons for pontoon pipe for United States engineers, Sacramento, Calif. Steel Tank & Pipe Co. Berkeley, Calif., was low on 208 tons for a welded steel pipe line for Oakland, Calif. Pending business involves less than 1600 tons.

Demand for structural shapes is well maintained and awards for the week were the second largest of the year, more than 4000 tons. Ingalls Iron Works, Birmingham, Ala., secured 300 tons for a warehouse at Trona, Calif., for American Potash & Chemical Co. Pacific Iron & Steel Co., Los Angeles, took 155 tons for a school bracing project at Santa Monica, Calif. Unnamed interests booked 110 tons for a bridge in Coos county, Oregon, for the state. United States Steel Products Co. was low on 1750 to 2250 tons for 9 to 11 radio towers for Summit, C. Z. Bids were also opened on a similar tonnage for radio towers at Pearl Harbor, T. H.

Bookings of cast iron pipe this year are nearly 3000 tons below the total for the same period a year ago. United States Pipe & Foundry Co. was low on 628 tons of 16-inch pipe for Oakland, Calif. Bids have been opened on 197 tons of 4 to 16-inch pipe for Laguna Beach, Calif.

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Seattle Outlook Improves

Seattle—Iron and steel awards in the Pacific Northwest are not large, but the outlook is improved. Prices are well maintained.

Important tonnages due for action soon include 2300 tons of reinforcing for the Bonneville project, 700 tons for the Coulee dam bridge, the Deception bridge in Washington, additional contracts for the Seattle seawall job and Tacoma's proposed water system.

The week's awards included 440 tons of shapes for the Owyhee crossing to the Chicago Bridge & Iron Works. Chicago, and 450 tons of shapes, galvanized steel and castings for the Pearl Harbor, T. H., navy station to the Pacific Car & Foundry Co., Pacific Coast Forge Co. and Olympic Foundry Co., all of Seattle.

This week 1015 tons of reinforcing and 575 tons of castings, the first of the 5500-ton order placed with the Pacific Coast Steel Co., was shipped from Seattle to Pearl Harbor. State bids will be received Feb. 27 for two concrete girder bridges at Colfax, Wash., taking 100 tons of reinforcing. Department of the interior will open bids at Seattle Feb. 28 for supplying 16,000 feet of 12 to 36-inch corrugated metal culvert pipe for shipment to Alaska.

Small tonnages feature the pipe market. Astoria, Oreg., has opened bids for 120 tons of 2, 6 and 12-inch cast iron pipe. Everett, Wash., has purchased additional materials for the Alderwood Manor extension from the Pacific Water Works Supply Co., Seattle, and is considering tenders for 6080 feet of 2-inch water pipe. Identical bids were offered by five firms.

Steel in Europe

Foreign Steel Prices, Page 46

London—(*By Cable*)—A lull has followed recent increases in prices, consumers having covered, but blast furnaces and steelworks are scheduled well ahead. Three hematite furnaces have been restarted on the East Coast. Tin plate is dull. Export trade is disappointing.

January exports, at 163,695 tons, declined 9405 tons from December, while imports, at 119,820 tons, were 28,520 tons heavier than in December.

The Continent reports export trade fair. The German domestic market s satisfactory, but French domestic buying is dull.

New Trade Publications

LIQUITOL—Alpha-Lux Co. Inc., 192 Front street, New York, in Bulletin AL-16-A tells what the product is, its uses and results attained in its application.

ALUMINUM PAINT—Quigley Co. Inc., 56 West Forty-fifth street, New York, has issued a bulletin on its new aluminum paint for machinery, as protective and decorative covering.

LATHES—South Bend Lathe Works, South Bend, Ind., has prepared a catalog, No. 94, of its complete line of lathes and attachments for various uses. It covers 96 sizes and types of lathes.

DIE HEAD—Geometric Tool Co., New Haven, Conn., has issued a booklet on its combination circular and tangent chaser die head, with illustrations and tables of specifications.

MOTORS—Louis Allis Co., Milwaukee, in Bulletin No. 505-C shows detailed construction of its motors and illustrates and describes characteristics and uses of various types of motors.

WRENCHES—Bonney Forge & Tool Works, Allentown, Pa., in its catalog No. 34 covers its complete line of wrenches, screw drivers, chisels, punches, hammers, and other tools.

STEEL—Edgar Allen & Co. Ltd., Sheffield, Eng., is distributing a booklet designed to serve as a guide to the wide variety of steel products produced by this company. It is marginally indexed to aid in reference.

PUMPS—Worthington Pump & Machinery Corp., Harrison, N. J., in Bulletin W-318,S3B describes and illustrates its two-stage volute centrifugal pump, type UB, with drawings and table of dimensions.

VIBRATING SCREENS — Jeffrey-Traylor Division, Jeffrey Mfg. Co., Columbus, O., has issued four bulletins devoted to electrically operated vibrating screens, vibrating conveyors, vibrating feeders and vibrating coolers-dryers.

ROPE DRIVE—Allis-Chalmers Mfg. Co., Milwaukee, has issued a revised leaflet, No. 2134-A, giving engineering data, sheave diameters, number of grooves, bores and other dimensions on Texsteel sheaves for Texrope drives.

GRINDING—William Sellers & Co. Inc., Philadelphia, has issued a bulletin on machine grinding of tools compared with hand grinding, illustrating the better results attained by the former. The company's tool grinder is shown in detail and specifications are given.

HIGH-SPEED TOOLS—Carboloy Co. Inc., Detroit, has issued a booklet on Carboloy cost-saving tools. It is a pictorial description of methods of manufacture of tools and illustrations show not only this but also a variety of tools adapted to standard and special uses.

HEATERS — General Electric Co., Schenectady, N. Y., has published a booklet entitled "Spots of Heat for Industrial Plants" in which it illustrates through drawings various applications for its line of spot, strip and dip-heating units.

HOISTS—Construction of its line of electric hoists for a wide variety of industrial uses is described and illustrated in a recent bulletin of the Harnischfeger Corp., Milwaukee. Important features of design are stressed and the ratings and operating ranges of the hoists are included.

CONVEYORS — Mathews Conveyor Co., Ellwood City, Pa., has published an illustrated booklet on its line of conveyors for steel and metalworking industries. Detailed information is given on construction of the various types of rollers, wheel conveyors and ball transfers.

FRICTION MATERIALS — Johns-Manville, 22 East Fortieth street, New York, has issued a bulletin on industrial friction materials and their selection. The text includes information on linings, clutch facings and other friction materials. Recommended charts are included.

HEATING FURNACES — Sullivan Machinery Co., 400 North Michigan avenue, Chicago, has published bulletin 74-D on its drill steel furnaces. Illustrations show several types of furnaces, sectional views, typical installations, methods of brick assembly and a brick cutter for fitting and repairing linings.

AIR PREHEATERS—Air Preheater Corp., 60 East Forty-second street, New York, under the management of the Superheater Co., has issued bulletin No. 933 on its air preheaters for public utility and industrial steam power plants and for the recovery of industrial heat. Numerous applications are shown.

COUPLINGS—A coupling which operates centrifugally as an automatic starter is described in bulletin No. 500 by the Falk Co., Milwaukee. Information is given on the use of the coupling for direct connection, for overhung drives, and for dual drives, as well as details of construction.

ELECTRIC FURNACES — Special furnaces for production of ferroalloys, calcium carbide, annealing and smelting are described and illustrated in a recent bulletin of the Pittsburgh Lectromelt Furnace Corp., Pittsburgh. A second bulletin describes rapid melting furnaces of moderate size for melting and refining various plain and alloyed irons and steels, nickel compositions, and for special work where suitable electric power is available.

AUTOMATIC CONTROL — Control equipment which maintains a constant condition with respect to pressure, draft, differential pressure, volume, rate of flow, water level, humidity, temperature, speed of rotation and many other circumstances is described in detail in a recent bulletin of H. A. Brassert & Co., 310 South Michigan avenue, Chicago. The publication presents a description of the jet pipe regulator which operates the system of regulation, and also many combinations and accessories which are used when several conditions must be controlled at once.

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Construction and Enterprise

New England

HARTFORD, CONN.—Caloroil Burner Corp. has been formed to manufacture oil burners and equipment, by Charles H. Cook, 76 Westerly terrace, Hartford, Conn.

SPRINGFIELD, MASS. — Spartan Saw Works Inc. has been incorporated to take over the business and plant of a company with the same name, to manufacture saws and blades, by Harold F. Strout, 152 Fisk avenue, Springfield, Mass.

New York

AUBURN, N. Y.—City has plans for a municipal electric light and power plant and electric distributing system, to cost about $310,000. Burns & McDonnell, 107 West Linwood boulevard, Kansas City, Mo., is engineer.

BATAVIA, N. Y.—Doehler Die Casting Co. has shipped eight brass machines to Batavia from its plant at Toledo, O., to comply with requirements of the state for production of castings for state industrial plants, that they be produced in the state.

BROOKLYN, N. Y.—Moss Mfg. Co. Inc. has been formed to manufacture refrigerators and similar equipment, by Samuel Sandler, 4315 Seagate avenue, Brooklyn, N. Y.

CASTILE, N. Y.—Construction of a new school building to cost $85,000 has been authorized.

ELMIRA, N. Y.—Fire damaged the plant of the John D. Ward Foundry with loss estimated at $15,000.

NEW YORK—Truby Corp. has been incorporated with $10,000 capital to manufacture sheet metal products, by Daniel R. Bacon, 11 Wisner terrace, Goshen, N. Y., Conrad Trubenbach, 101 Park avenue, New York, and associates.

NEW JERSEY

ASBURY PARK, N. J.—Weeden's Machine Shop Inc. has been incorporated with $10,000 capital to manufacture machine patterns, by Doris L. Weeden, 907 Fourth avenue, Asbury Park, N. J.

ELIZABETH, N. J.—Molaska Products Corp. plans to install electric motors and pumps in its plant, at cost of about $150,000.

MIDDLETOWN, N. J.—St. Clair Oil Burner Corp. has been incorporated to manufacture oil burners and equipment, by Ralph T. Moon, State highway and Conover lane, Middletown, N. J.

Pennsylvania

PHILADELPHIA—Atlantic Refining Co., 260 South Broad street, will install tanks, pumping machinery and other equipment in rebuilding its burned gasoline refinery, at cost of about $100,000.

PITTSBURGH—Mine Safety Appliance Co. has been awarded 2000 submarine escape and respiratory appliances by the navy department, Washington.

WEST BROWNSVILLE, PA. — Samuel Thompson plans to recondition the former West Side distillery at cost of about $75,000.

WILKES-BARRE, PA.—Hazard Insulated Wire Works is adding a department for the manufacture of automotive ignition wire and a new type of noncorrosive storage battery terminals developed by its research department.

YORK, PA.—York Ice Machinery Co. has received an order from the Pullman Car & Mfg. Co., Chicago, for air conditioning equipment for 19 pasenger cars.

YORK, PA.—Martin-Parry Corp. will start at once producing 540 gun carriages for the United States government, to cost $178,000. Carriages are for field artillery of the French 75-millimeter type.

Ohio

CLEVELAND—Iron Fireman Mfg. Co., 3179 West 106th street, has awarded a contract to the Austin Co., 16112 Euclid avenue, Cleveland, for a 1-story brick and steel addition, 60 x 80 feet.

LORAIN, O.—City plans construction of a municipal electric light and power plant with federal aid ,to cost $1,500,000. H. F. Harmount, 2417 Oak Park avenue, Cleveland, engineer, will take bids.

SANDUSKY, O.—City has engaged Froehlich & Emery, Second National Bank building, Toledo, O., to prepare plans for a municipal electric light and power plant, to cost about $1,400,000, for which bonds have been authorized. Bids will be asked soon.

Michigan

DEARBORN, MICH. — Dearborn Stamping Co., 10501 Haggerty avenue, has been incorporated with $50,000 capital to deal in metal products, by Stanley G. Lewis, 13634 Ware avenue, Detroit.

DETROIT—Paterson Engineering Co. Inc., 8044 Wheeler street, has been awarded the general contract for construction of an electric lighting plant at Shelby, O., to cost about $36,000.

DETROIT—Detroit Axle Shaft Mfg. Co., 3025 Bagley avenue, has been incorporated with 10,000 shares no par value to manufacture axle shafts, by Morris Halperin, 3210 Calvert avenue, Detroit.

DETROIT — Multi-Hydromatic Welding & Engineering Co., 5725 Mt. Elliott avenue, has been incorporated with $10,000 capital to deal in welding equipment by Hans C. Warnke, 6126 Bishop avenue, Grosse Pointe Park, Mich.

Indiana

ALEXANDRIA, IND. — Alexandria Metal Products Co., Central avenue, is consolidating its two plants in the main works, the foundry department being moved to the machine shop plant in Central avenue. Products are automobile parts and accessories.

COLUMBIA CITY, IND.—City plans extensions and improvements in the municipal electric light and power plant ,including a 1000-kilowatt turbogenerator and auxiliaries, to cost $116,000.

FORT WAYNE, IND.—American Air Conditioning Corp. has been organized to manufacture air-conditioning equipment and supplies, by C. A. Rodman and asociates, Fort Wayne, Ind.

TIPTON, IND. — City plans construction of a municipal electric light and power plant to cost $100,000.

Illinois

CHICAGO—Hubbard Devices Inc., 1622 Carroll avenue, has been incorpo-

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CHICAGO DETROIT

rated with 500 shares no par value to manufacture products of iron, steel, copper and wood, by Kriebel & Hubbard, 3247 Grove avenue, Berwyn, Ill.

CHICAGO—Shakeproof Lock Washer Co., 2501 North Keeler avenue, has been incorporated to manufacture screws, dies, machine parts and specialties.

CHICAGO—Sanitary District of Chicago, 910 South Michigan avenue, plans erection of a powerhouse, including two 8500-kilowatt units, at Lockport, Ill. Cost estimated at $800,000. P. Harrington, 910 South Michigan avenue, Chicago ,is engineer.

Southern

WILTON, ALA.—Town has filed application with PWA for loan to finance construction of water works, including 75-gallon-per-minute booster pump, one 100,000-gallon steel elevated tank, valves and hydrants. The cost is estimated to be $33,000. John M. Gilfillan & Associates, 617 North Tenth street, Birmingham, are the consulting engineers.

WASHINGTON — Robert E. Anderson is low bidder at $29,351 for boilers and stokers for National training school for boys.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids until March 6, schedule 1794, for one motor-driven universal cutter head grinder for delivery at San Diego, Calif.

FT. PIERCE, FLA.—Ft. Pierce Development Co., care Capt. F. M. Upton, plan erection of a precooling and cold storage plant soon, to cost $380,000.

TAMPA, FLA.—Southern Brewing Co., Charles A. McKay, president, has bonght a 4-story building to be converted into a brewery with capacity of 100,000 barrels yearly. Bids for equipment will be taken by E. A. Siebel & Co., 8 South Dearborn street, Chicago, technical advisers.

ATLANTA, GA.—Selig Co., 336 Marietta street, manufacturer of chemicals, plans construction of a 1-story powerhouse, 22 x 45 feet, to cost about $20,000.

FOLKSTON, GA.—City will receive bids Feb. 26 for water works improvements. J. B. McCrary Engineering Corp., Atlanta, Ga., are engineers.

CARROLLTON, KY. — Kentucky Richland Distilling Co. plans erection of a distillery. Ford, Bacon & Davis, 39 Broadway, New York, are engineers.

LOUISVILLE, KY.—Fire recently damaged machine shops of Louisville & Nashville railroad at South Louisville, Ky.

LOUISVILLE, KY. — Merhoff-Balmer Iron Works has been incorporated with $10,000 capital, by J. H. Merhoff, William H. Balmer and associates.

MARTIN, KY.—Loan of $43,000 for the city has been approved and plans are in preparation by Frank S. Parrigan, engineer, Painesville, Ky., for a water project, including 500-gallons per minute pump, two centrifugal pumps, 250-gallon per minute, 100,000-gallon elevated steel tank and 18,000 feet of mains.

MIDDLESBORO, KY.—City plans construction of a municipal diesel-engine generating plant to cost about $328,000.

OWENSBORO, KY.—McCulloch's Green River Whiskies Inc., care L. Freeman Little, vice president, plans a 1-story powerhouse and electric equipment in its plant. Total cost of plant is $300,000. J. Wendell McCulloch, Bowling Green, Ky., is treasurer.

NEW ORLEANS—Edwin J. Rodriguez, 143 Sherwood Forest drive, designing engineer for Great Southern Alcohol Co., will have plans on market for quotation in about 30 days, and also for alcohol redistill, bottling equipment, etc.

ALEXANDRIA, LA.—City has been granted federal loan of $250,000 for extensions and improvements in the municipal power plant, including new boilers and accessories.

BALTIMORE—American Can Co., First National Bank building, is planning to erect a three-story addition.

BALTIMORE—Department of public works has let contract to Consolidated Engineering Co. Inc., 20 East Franklin street, for $152,300 for building pumping station at Ashburton, Md. Contractor is taking sub-bids.

BALTIMORE—Baltimore Steel Drum Co., 1550 Ridgeley street, has been incorporated to manufacture steel drums, tanks and other plate products, by Samuel Klein and Elmer Aaron, Baltimore.

BALTIMORE — Consolidated Gas, Electric Light & Power Co., Lexington building, has plans completed for a steel tank 115 feet in diameter and 40 feet high, at Race stret and B. & O. railroad, to cost $30,000; also a 1-story building at the same location.

ELK MILLS, MD.—Elkforge Distilling Corp. plans erection of a distillery. Ford, Bacon & Davis, 39 Broadway, New York, are engineers.

HICKORY, N. C.—G. & H. Hosiery Mill Co. has started excavating for new building at Eighth avenue and Twenty-third street, and will remove present equipment from existing building and add new machinery.

NORTH WILKESBORO, N. C.—Application has been made by city for loan and grant of $50,000 for waterworks.

Missouri

KANSAS CITY, MO.—United States division engineer, 707 Postal Telegraph building, Kansas City, Mo., will receive bids until March 2 for one stationary electrically driven, two-stage air compressor. R. C. Moore is lieutenant colonel in charge.

ST. LOUIS—Premier Bronze Corp. has been incorporated by Hayden Rubelman, 4605 Lindell street, and associates.

Oklahoma

GUTHRIE, OKLA.—City plans waterworks extensions, to cost about $150,000. PWA loan has been approved. T. Ferrell is city engineer.

MUSKOGEE, OKLA.—Election will

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be held in April on issue of $1,200,000 in bonds for construction of a diesel engine generating plant and distribution lines. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is engineer.

OKLAHOMA CITY, OKLA.—Capital Iron & Metal Co. Inc., has been incorporated with $10,000 capital, by Reuben and Ralph Finkelstein and associates.

OKMULGEE, OKLA.—Superior Pipe & Supply Co. has been incorporated with $15,000 capital by B. W. Parks and associates.

Texas

DALLAS, TEX.—Liebmann Breweries Texas Distributing Corp. has been incorporated with $20,000 capital by George O. Middrie and associates.

DALLAS, TEX.—M. K. T. railroad has permit for erection of a steel shed 50 x 100 feet.

DALLAS, TEX.—City, John B. Winder, superintendent, of water department, will spend $208,000 for waterworks improvements, including an elevated storage tank and main extensions.

DALLAS, TEX.—Model Brass Co. has been incorporated to manufacture nonferrous castings, by Moise Corf and associates, Dallas, Tex.

Wisconsin

EAU CLAIRE, WIS.—Gillette Rubber Co. plans a powerplant addition to cost about $45,000 to its plant here.

Minnesota

ST. PAUL, MINN.—An election will be held March 6 on bonds for $10,230,000 for a municipal power plant. George M. Shepard, city engineer, is in charge of project.

Iowa

IOWA CITY, IOWA—City has authorized plans for a municipal electric light and power plant to cost about $800,000. Federal aid is being sought.

Kansas

KANSAS CITY, KANS.—Carswell Mfg. Co., manufacturer of roadbuilding machinery and corugated road culverts, suffered heavy loss by fire which destroyed two buildings of its plant. Much equipment was involved. Rebuilding will be undertaken at once.

Nebraska

HASTINGS, NEBR.—A federal grant and loan of $140,000 has been approved for extensions and improvements in the municipal electric light and power plant, including generators and auxiliary equipment, a 25-ton overhead traveling crane. Black & Veatch, Mutual building, Kansas City, Mo., are engineers.

Colorado

CLIMAX, COLO. — Climax-Molybdenum Co., Climax, plans installation of new floatation and grinding machinery and a steam plant, to cost about $40,000.

DENVER—Silver & Roberts Iron Works, 3309 Blake street, suffered about $1000 loss by fire, largely water damage to equipment.

Montana

GLASGOW, MONT.—Bids will be opened at the division engineer's office at Kansas City, Mo., March 2 for furnishing ladders and spare parts, and March 1 for dredge pumps and spares for the Fort Peck project.

Arizona

TUCSON, ARIZ.—An election will be held March 6 on issuance of $250,000 in bonds to improve the waterworks system. P. E. Fernald is city engineer.

Pacific Coast

LOS ANGELES—Continental Can Co. plans to build a $150,000 addition to its plant at 3820 Union Pacific avenue, two stories, 174 x 200 feet.

OLYMPIA, WASH.—Plans have been prepared and bids will be asked soon for a $500,000 science and chemical building at Pullman state college at Olympia, Wash.

SEATTLE — Fentron Steel Works Inc. has been organized with $10,000 capital by H. H. Schiessel, E. J. Miller, 706 McDowall building, Seattle, and asociates.

TACOMA, WASH.—Hooker Electro-Chemical Co., 605 Alexandria avenue, has obtained a building permit for a reinforced concrete addition to its power house, 35 x 35 feet.

Dominion of Canada

LONDON, ONT.—R. Gintson & Son, London, Ont., have been awarded the contract for a 2-story boiler house for Silverwoods Ltd. Building and equipment will cost about $50,000. Three boilers, stokers and pumps are included.

MONTREAL, QUE.—Canadian Copper Refineries is erecting a 3-story addition to its plant, costing $100,000, to provide for expansion and rearrangement of its machinery.

Mexico

MEXICO CITY, MEX.—Six naval bases, three on Gulf of Mexico and three on Pacific coast, are to be built to accommodate 21 naval vessels constructed in Spain for government. One is under construction at Manzanillo, Mexico, at cost of $336,000. Others will be at Vera Cruz, Alvaro Obregon, Progreso, LaPaz and Acapulco.

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FORGING MACHINES—AJAX, NATIONAL, ACME, Steel Frame, Late Type, Motor Drive, Sizes 1 to 5".
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FURNACE—500 lb. MOORE Rapid Lectromelt for electric steel melting, 3 ph. with complete electrical equipment including Transformer, 2200 to 120 V AC.
PRESS—BLISS No. 6 1/2 Straight Side, Double Crank with spring counterbalance. Belt Drive. 54" bet. housings. 8" stroke.
BLISS No. 25-1/2-H, 96" Double Crank Gap Frame, AC MD and motor adjustment, 6" shaft, 33 strokes per min.
ROLL FORMING MACHINE—YODER, Type H-820, dir. conn. MD, roll displacement 11".
SHEARS—No. 10 BUFFALO for bars and shapes, cap. up to 3-7/8" rounds and corresponding duty in other shapes. Direct connected AC MD with motor.
SHEARS, GUILLOTINE—No. 5 and No. 7 HILLES AND JONES, cap. to shear up to 6" round mild steel, MD including AC motors and starters.
TESTING MACHINE—50,000 lb. RIEHLE Universal. MD. Rebuilt by manufacturers and guaranteed for accuracy.
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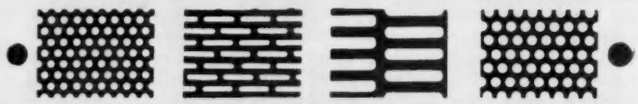

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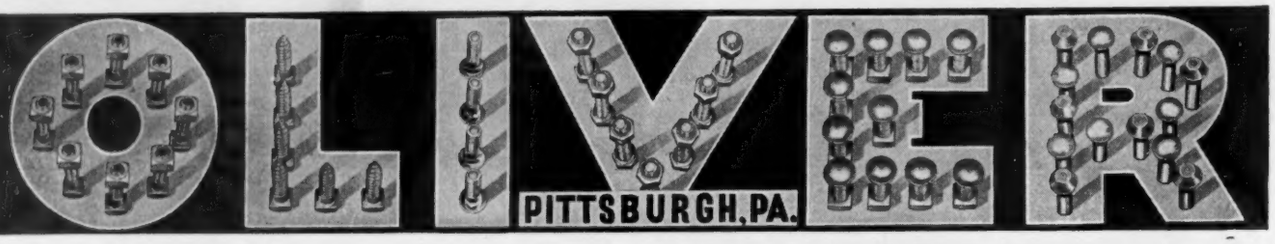

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